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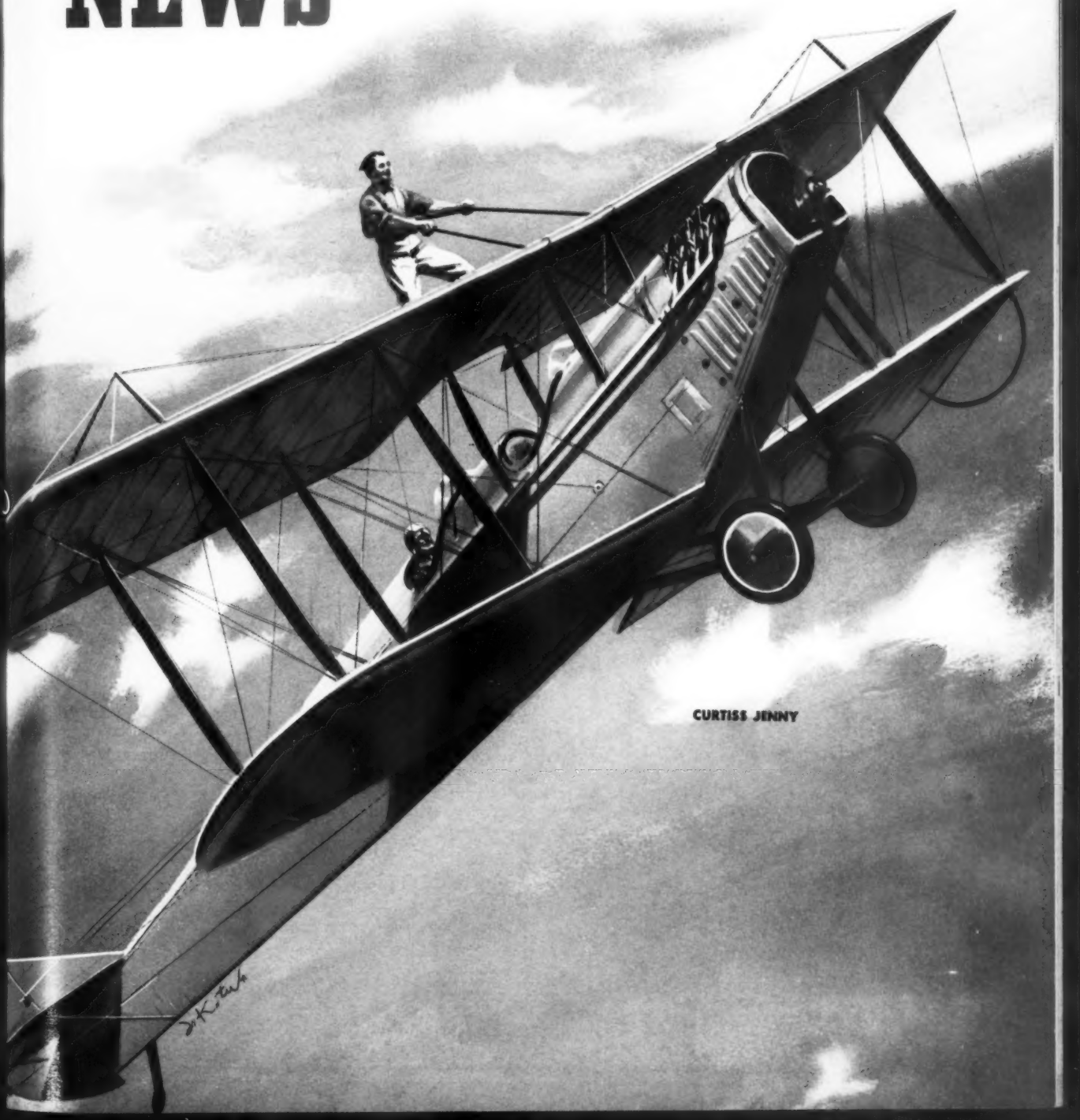

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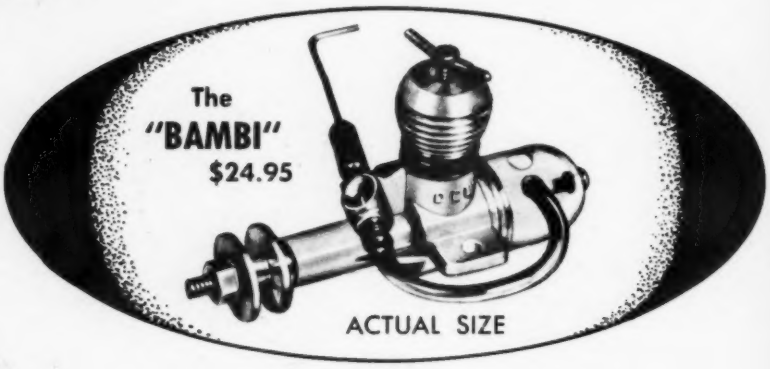

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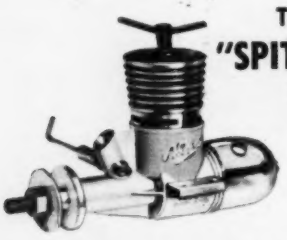

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26th Year of Publication

SEPTEMBER 1954 Vol. LI—No. 3

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WILLIAM WINTER, Editor
WITTICH HOLLOWAY, Art Director

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by William Winter

Whether or not Pan American's new load-endurance event that was appropriately launched at the last Mirror Flying Fair will prove a shot in the arm for controlline flying remains to be seen. That the rules are a challenge and a stimulant to any model designer is obvious. Chris Schuck, the first winner of the new event, and whose fascinating account of experiment leading up to that win leads off this September issue, makes one appreciate how special events produce new and interesting twists in the hobby.

His ship looks like a misplaced RC job. Although more heavily loaded than an RC, it is, nonetheless, a not too distant cousin. Of the many problems that had to be solved, probably the one that best illustrates the point is his gimmick for turning the needle valve in flight. After all, when you begin to use fuel by pints and quarts, fuel feed will vary with drop in fuel level until the engine stops with most of the energy still in the tank. Chris outlines other possibilities for obtaining consistent fuel feed but, to meander a moment, you'll find a dilly in Lorenz's Radio Control News (for October) of the Britisher Pike's (of Fenners-Pike actuator fame) use of a rubber balloon outside the tank to maintain pressure. Not only that, but Pike has an .87 displacement Diesel in a 7-ft. RC ship on his flight of more than an hour, with the motor on a pylon above the wing for maximum efficiency, and fuel way down below in the fuselage.

You know, we all tend to take the other fellow's airplanes for granted. At the next contest, ask some of the guys why they did this or that. Chances are, like MAN at Work, you'll wonder sometimes if you aren't a copyist rather than a pioneer, and then you'll redouble your efforts toward a fresh approach. Asked Schuck if he didn't think that Pan Am shouldn't restrict the fuel carried in order to reduce time in the air. A couple of (*Continued on page* 6)

PLANE ON THE COVER

Most famous of all American planes to come out of World War I, the Curtiss JN-4D was then our Number One trainer. Built by the thousands in this country and in Canada, where it was known as the Canuck, the basic Jenny lived on long after the war as the chief mainstay of the early barnstorming pilots. Scenes like this one, which artist Jo Kotula did from a boyhood memory, were commonplace around the land. Flying circus performed spectacular feats now gone forever. The beloved Jenny spanned not quite 44 feet, had a Curtiss OX-5, 90 hp engine.

NEXT MONTH'S COVER

Pound for pound the most wicked bomber created by man is Douglas A4D Skyhawk, diminutive 27-foot span carrier plane, capable of dropping the atom bomb or of crossing the United States non-stop. Its speed, small size and comparatively light weight, even as a fighter, have earned it the nickname of Heinemann's Hot Rod, after Douglas designer who fought for idea.

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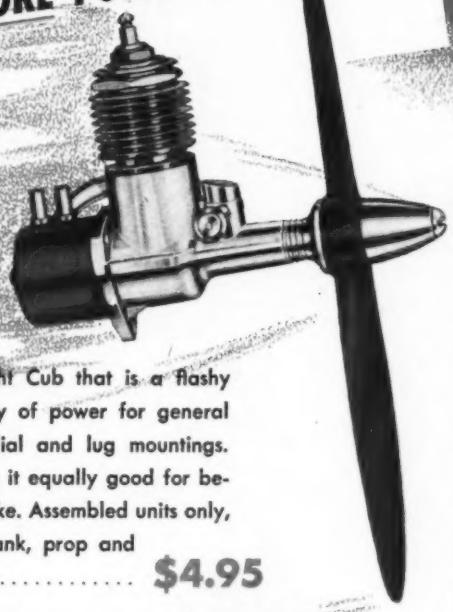

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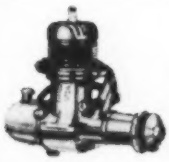

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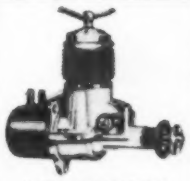

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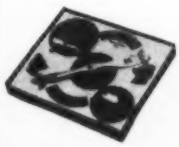

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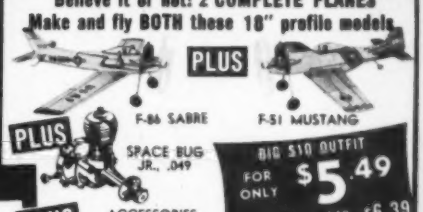

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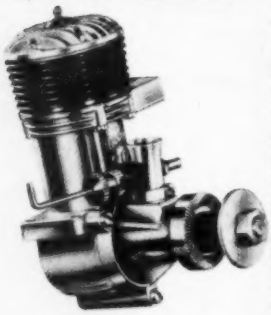

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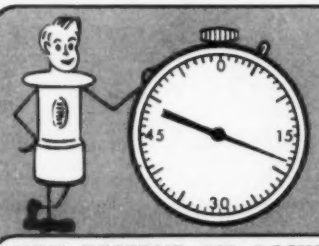


IT'S ABOUT TIME

YOU DESERVE AN ACCURATE TIMER

Lud Kading, designer of the Infant and other engines, is back in the model field again and is introducing this very necessary item, the **TIMIT** (pronounced Time It), as the *first* in a line of new products.

The **TIMIT** incorporates modern design along with years of practical model engineering and designing experience. Easy to install, light in weight (approximately ⅓ of an ounce), simple in operation, it has a needle type adjustment for greater dependability and accuracy. The **TIMIT** can be adjusted from 0 seconds to 2 minutes with a slight turn of the adjusting screw to give you "split second timing." **It will retain its setting for flight after flight.**

The **TIMIT** features: high pressure aluminum alloy case, stainless steel shut-off valve shaft, inlet and outlet tubes set at 90° to each other for more convenient hook-up. These and other features make the **TIMIT** the most accurate and dependable flight timer you can install in your favorite model plane.

ONLY $2.25

Don't fight it TIMIT

Kading Specialty Co.

P. O. BOX 484, COMPTON, CALIFORNIA

MAN at Work

(*Continued from page 2*)

two-hour flights and the Contest Director will have had it. But Schuck said no, the way to do it is to reduce the allowable gross (7 lb.) to, say, 6 lb. You still have to carry the same 3 lb. chunk of lead but, other things being the same, you can't possibly carry the same amount of fuel, and duration falls off. Schuck believes his airplane eventually will do two and a half hours.

• • •

▸ Beginning MAN's second quarter century of continuous monthly publication. We count ourselves fortunate to have so many of the hobby's leading lights with this issue. Readers who have been crying for Half-A scale won't be disappointed with Walt Mooney's Wimpy. There's a wonderful story behind the home-built flivver planes of the 'twenties and early 'thirties and no designer rated higher than Les Long—not even Ed Heath. These happy crates certainly did no harm and, in fact, made a vital contribution to aviation. From the amateurs eventually came the forerunners of the original Cubs and many others that made the light plane industry. We can't give you that story here, unfortunately, but we can dedicate the Wimpy model to those who, like Long, labored so hard—and unsung. The model, incidentally, is but one of many that the California boys have been flying in contests among themselves. If they keep at it, we'll be seeing a revival. Mooney is one of the best scale modelers; don't hesitate to make this model!

Leo Holliday's "What's New in Speed?" puts on the line more useful facts about speed than we've ever seen assembled before. Willis Nye gladdens the eye of the superdetailed plan collectors and lovers of ancient aircraft. His AEG speaks for itself. Nye, incidentally, has been doing this sort of thing since the early days of aviation. His Antoinette VII (March, 1954) drawings reminded him he'd seen actual flights of the real machine. Christy Magrath was moved to remark: "Nye did a fine job on the Antoinette. I have good photos and early drawings . . . also have a section of fabric off one that killed its pilot, Charles Wachter, at Rheims, France, on July 3, 1910. This fabric is a very fine linen, but very thin and light. It is a light tan color." To cut it short, we're sure you'll agree the ships and articles this month are the best.

• • •

▸ Team racing, to judge by the increasing number of clubs that are concentrating on the pretty speedsters, is moving right along. The Atlanta, Ga., Team Race Club, for example, was started last April, now has 16 members, and a couple of good contests under its belt. The ATRC runs three-to-a-heat races, with four or five in the consolation. The winding of engines and the color of the flags, says Jerry Hunt, create lots of spectator interest. The boys have turned up to 112 mph unofficially, but winning times are a shade under 80. Kits do pretty well for them. The grapevine has it that Veco's Redskin is one of that company's most successful kits. This ATRC outfit invites letters from team race fans: Jerry Hunt, 377 Amal Drive, S.W., Apt. 6, Atlanta, Ga.

• • •

▸ Well, the family's wild flying with that Ringmaster came to a sudden end when the intrepid pilot tried a loop with the wrong

(*Continued on page 42*)

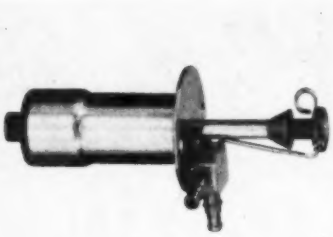
CORRECTION

In the Kading Specialty Co. August advertisement, page 39, the *Timit* price was listed at $2.95. This was an error. The correct price is $2.25.

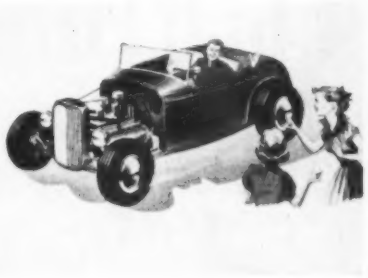
TRADE SHOW

MONTHLY REVIEW OF NEW PRODUCTS, OTHER INTERESTING ITEMS WORTH ATTENTION

▸ *Kwik Start:* Cheminol's (Cheminol Corp., Los Angeles, Calif.) new glow plugs in four types. The KS-1 (short body, short thread) is for Half-A engines; KS-2 (long body, long thread) for ABC; KS-3 (short body, long thread), also ABC; and KS-4 (long body, short thread) for Half-A. 65¢.

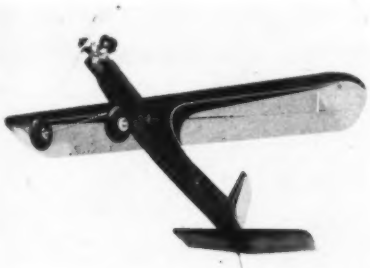


▸ *Timit:* First of series of products by Lud Kading (Kading Specialty Co., 215 E. Palmer Ave., Compton, Calif.) is precision timer retailing at $2.25. Features new 90-degree inlet and outlet tubes for easy tank to engine hook-up, and positive needle valve adjustment. Is easy to adjust, install.

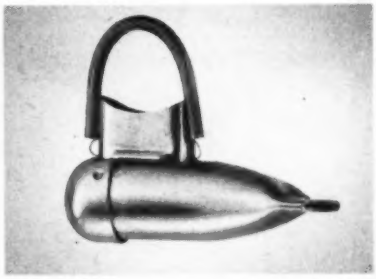


▸ *Hot Rod Kit:* Monogram's (Monogram Models, Inc., 3421 W. 48th Pl., Chicago, Ill.) all-plastic kit of the 1932 Ford V-8, Class C, street roadster, stripped of fenders, hood and top with channelled body, dropped and filled front axle, racing head engine, etc., has all parts molded and fully detailed 98¢.

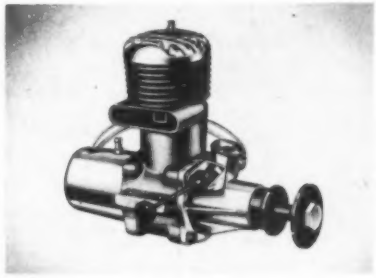
▸ *Monoline Trainer:* By Victor Stanzel & Co., Schulenburg, Texas, a profile trainer plane featuring Stanzel's single line control system. A 36 in. wing span suits it for powers varying from .19's up to .35's. Has formed balsa wing and tail as well as fuselage. Flippers already hinged to stab, wing counterweights, other thoughtful details. Up to a 150 ft. line. $3.95. System uses a special control handle.



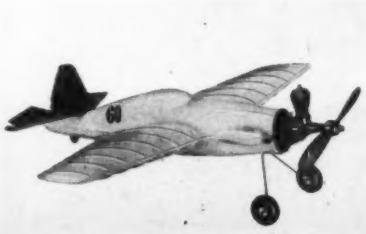
▸ *Froom Muffler:* Do yourself and everyone else a big favor by installing one of these mufflers to cut down the racket where flying site problems exist. No loss of rpm, easy to install, long stack to clear fuselage. Aluminum, 1 in. diameter, 3 in. long. Two exhaust stack hole sizes: 3/8 x 1; 3/8 x 1-5/16. Either costs $1.25. Also will fit other sizes by slight adjustments. A must for group activity.



▸ *Super Stunt Engine:* Designed expressly for stunt, radio, new McCoy .29 is version of ".29 Sportsman." It features extremely long suction; therefore, has good feed characteristics. A ringed engine, it will also be a factor in team racing. Has longer front plate, new crankshaft, revolutionary port timing design. McCoy Products Co., 8509 Higuera St., Culver City, Calif. It sells for $9.95.

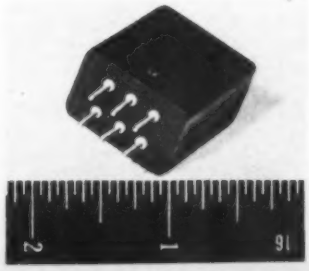


▸ *Cox TD-3:* Latest in the Thimble Drome line (L. M. Cox Inc., Santa Ana, Calif.) is stunt job, ready to fly with Cox Space Bug Jr. Made of high impact plastic for durability, little controlline capable of eights. According to Cox, new plane is competitive to other motorized toys. Retail is $10.95.



▸ *Ringmaster:* Logical step from trainer to stunt is .09 to .19 profile stunter, as by Sterling Ringmaster Jr. Designed by Matty Kania, it performs the works. All balsa and plywood parts are die cut. Edges shaped and notched. Sterling Models, 1530-34 N. Hancock St., Philadelphia, Pa. Price is $1.95.

▸ *Polarized Relay:* Distributed in U. S. by American Telasco Ltd., Huntington, N. Y., is sensitive, subminiature, lightweight relay. Sensitivity is less than 20 milliwatts. Has 3,000 ohms resistance. Sealed features keep out dust; plug-in design facilitates installation. Has silver contacts. Retails for $7.95.



GUILLOW'S Gas Model Kits

Control Line! Free Flight! Radio Control!

THE OUTSTANDING PLANES IN EVERY CONTEST

$5.95

Wing Span ..... 47 in.
Engine ..... .23 to .35 disp.

National Champion BARNSTORMER

- '50 & '51 National Stunt Champion.
- Winner of many other state and local contests.
- Beautifully engineered kit — all parts pre-fab for faster assembly.

Enter the winner's circle by flying this proven performer. Widely recognized as one of the nation's tip-top stunt ships.

Baby BARNSTORMER

Wing Span ..... 23½ in.
Engine ..... .035 to .049 disp. **$2.95**

- A junior version of the champion Barnstormer.
- The perfect ship for the new ½ A engines on the market.
- A full stunt job capable of the most intricate maneuvers.
- Completely prefabricated kit features accurate die-cut parts and crystal-clear plans and instructions.

FOR SPORT OR COMBAT FLYING

Trixter PROFILES

CLASS A · B

Wing Span ..... 32 in.
Engine ..... .19 to .35 disp. **$2.50**

CLASS B · C

Wing Span ..... 32 in.
Engine ..... .29 to .35 disp. **$3.50**

- Ideally suited for both combat and sport flying.
- Pre-fab two piece fuselage with hardwood motor mount — can be assembled in a jiffy.
- Performs all the stunts in the official A.M.A. stunt book.
- Flown by many clubs and individuals throughout the country.

NOTE: Engines and hardware not included in Trixter Kits

KIWI

SENSATIONAL FREE FLIGHT KIT

Designed by LEW MAHIEU

Formerly manufactured by K & B Manufacturing Co. Compton, California

GUILLOW KIWI ½ "A"

Wing Span 35 inches
Wing Area 200 sq. inches
Stabilizer area 67 sq. inches
Length 27 inches
Weight 5½ oz.
Engine .049 cu. inch disp.

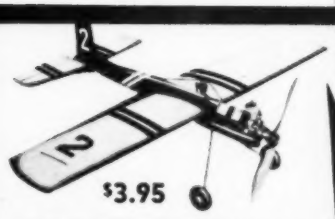
Retail **$2.50**

GUILLOW KIWI "A"

Wing Span 48 inches
Wing Area 375 sq. inches
Stabilizer area 125 sq. inches
Length 38 inches
Weight with K&B .15 15 oz.
Engine .14 to .19 cu. inch disp.

Retail **$4.50**

Engines not included



$3.95

PROFILE TRAINER

Wing Span ..... 32 in.
Engine ..... .19 to .29 disp.

Complete bellcrank assembly.
Elevator horn with mounting bolts.
Wheels. Wheel locks.
Hinging material. Finished push rod.
Finished landing gear.
Finished wing tip line guide.

First Place winner 1953 International RADIO-CONTROL EVENT

Trixter BEAM

$6.95

Radio-controlled for both 465 MC and 27.255 MC License-Free Bands

Wing Span	50.25"	Wing Loading	14-16 oz.
Wing Chord	8.25"	Power	.09 to .14
Effective Area	372"	Category	Radio & Sport
Body Length	35.25"	Ability	Contest & Trainer
Flying Weight	36.5 oz.		

Wheels, liquids, receiver and motor unit not included

NOW ON THE SAME TEAM

LEW MAHIEU

Guillow can now proudly boast of the 2 outstanding designers in the model aviation field. Lou Andrews, twice a champion in national contests, took first place in international competition with the Trixter Beam. Lew Mahieu, designer of the Kiwi, is an internationally known free-flight designer and is former holder of 14 world records. Their combined skills are available to you in these Guillow models.

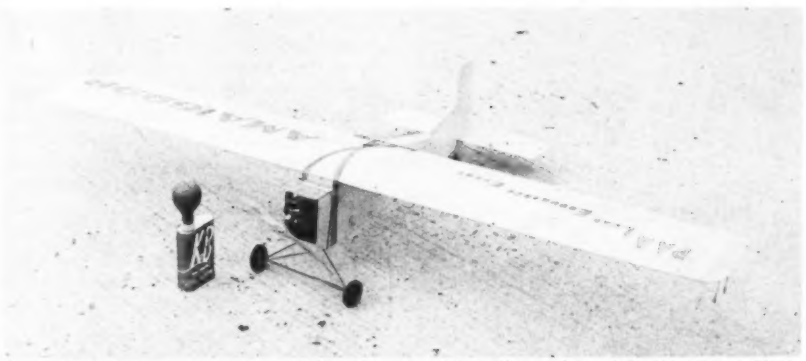
LOU ANDREWS

If not available at your Hobby Dealer send direct to factory adding 25¢ packing and postage in U.S.A., 40¢ outside U.S.A.

PAUL K. GUILLOW WAKEFIELD, MASS.

The time: May 15, 1954; the place: Floyd Bennett Field, Brooklyn, N. Y.; the incident: Chris Schuck nears the end of his 93 minute flight carrying three-pound cargo to become first winner of new event.

MODELING'S TOUGHEST EVENT?



Confronted with a strange mixture of full scale and model problems, plus such brainteasers as "how do we adjust the needle valve in flight?" Schuck came up with this functional RC-like airplane.

Despite its seven-pound gross load, 66-inch wing, .19 engine, the load-endurance job proved easy to fly and behaved well throughout its long flight despite very high winds. Fuel tank holds quart.

by CHRIS SCHUCK

Pan American's rules for their new PAA Load Endurance Event offer a unique challenge to model designers. This is the story of one modeler's successful answer.

For years, Pan American World Airways System has sponsored PAA Load Events for the free flight boys at many of the local, regional and national meets. These events and the prizes that go along with them have always caused a big turn-out and a lot of hot competition among the contestants.

This year, Pan American drew up a set of specifications and rules for a new event, the *PAA Load Endurance Event for Controlline Models,* which may be the shot-in-the-arm controlline needs to help get some of the boys out of the rut they have been in for the past few years.

The purpose of this event, as with all other FAA Load Events, is to have the model transport a payload. The actual method of scoring will be discussed a little later. The first contest of which this event was a part was the Mirror Model Flying Fair in New York on May 15, 1954. The event aroused interest and was considered a success by all who entered as well as by Pan American.

I think it would be best now to run over the rules and specifications as set up by Pan American and then look into some of the design features and details of the model that placed first at the Mirror Model Flying Fair.

Flight Rules and Specifications

1. *Power*: One engine, maximum .29 in. displacement.

2. *Lines*: 60-ft. Minimum diameter for total weight under 5 lb.—.016 in.; for total weight over 5 lb.—.018 in. All models subject to AMA safety regulations, including safety thong requirement.

3. *ROG*: Model must take off and on its own attached landing gears (no dolly take-offs); Models must take off on power of its own engine: jet assist, catapult or other launching device not permitted.

4. *Payload*: Model must carry in flight not less than 3 lb. (48 oz.) of payload within a closed compartment. Contestants must provide their own payload, which may be of any material. Payload must be carefully removable from the model for checking of weight. Except for weight and balance purposes, the payload shall not be used in any manner

Smiling George Gardner awards traditional Bulova watch to winner, Chris Schuck. During test flights, winning plane had attained two hours' duration, would eventually hit 150 minutes, says Schuck.

to influence the operation of the model, nor to contain or support any part of the model or its accessories. Cargo shall be securely stowed to prevent its leaving model during flight, and the judges' decision as to safety or arrangements for carrying payload shall be final.

5. *Weight*: Gross take-off weight of model, including payload and fuel, shall not exceed 7 lb.

6. *Flying*: Only one contestant may fly any one entry. Model must carry on take-off all fuel used in flight. Model must take off within three complete circles. Model must remain in flight at an average altitude above the height of the controlling hand of the contestant. Model must land and come to a complete stop without dislodging the payload from its compartment, or the payload compartment from the model. Contestant will have one opportunity of three minutes to get his entry into the air. If not airborne in three minutes, for any cause, contestant is relegated to end of assignment list for subsequent attempt.

7. *Scoring*: Model remaining in flight for the longest time, from take-off to time of next touching the ground, is the winner.

After reading these rules over a number of times to become more familiar with them, I made a number of outright decisions which affect the basic design of my plane. First of all, the model would have to be designed to take full advantage of the 7 lb. limit. Three pounds of dead weight are included in this 7 lb., which only leaves a balance of 4 lb. for the plane and fuel.

Since no limit is placed on wing area, or wing span, in the rules, I decided that the plane should be designed with a fairly large area. This in turn would give a reasonable wing loading and permit slow flying and take-off speeds. The wing loading on an average stunt plane is 11 to 15 oz. per square foot. I estimated on this basis a 22.5 oz. per square foot loading, using a Clark Y airfoil section which is much more efficient than the conventional symmetrical section found on most stunt jobs. This worked out to a required wing area of 5 sq. ft.

The next step was to decide what engine should be used. In making this selection I took into consideration the following items:

First was power loading, or the weight per cubic inch of engine displacement the engine is required to pull along. To assist me in selecting the power loading value to work with, I used Hal Roth's Clipper Cargo PAA Load Event winner at the '53 Nationals as a basis. Hal's plane had a flying weight of 29.25 oz. and was powered by an .049 engine which figured out to a power loading of 585 oz. per cubic inch of engine displacement. On this basis I selected a .199 engine which would give me a loading of approximately 560 oz. per cubic inch of engine displacement.

Below—Roger Christie launches wife Florence's plane to third place in the load-endurance event. This ship more generally resembled existing stunt jobs, but note odd third wheel making trike gear.

All-wing solution was the entry of Earl Symonds. Entire trailing edge formed hinged elevator.

The engine had to be capable of turning a 10 in., 5 or 6 pitch prop at reasonable speeds with a moderate fuel consumption. It would also have to be capable of operating over wide variations in fuel level similar to a stunt engine. The engine would also have to be able to stand up without overheating and without excessive wear during runs much longer than the manufacturer intended at the time the engine was designed.

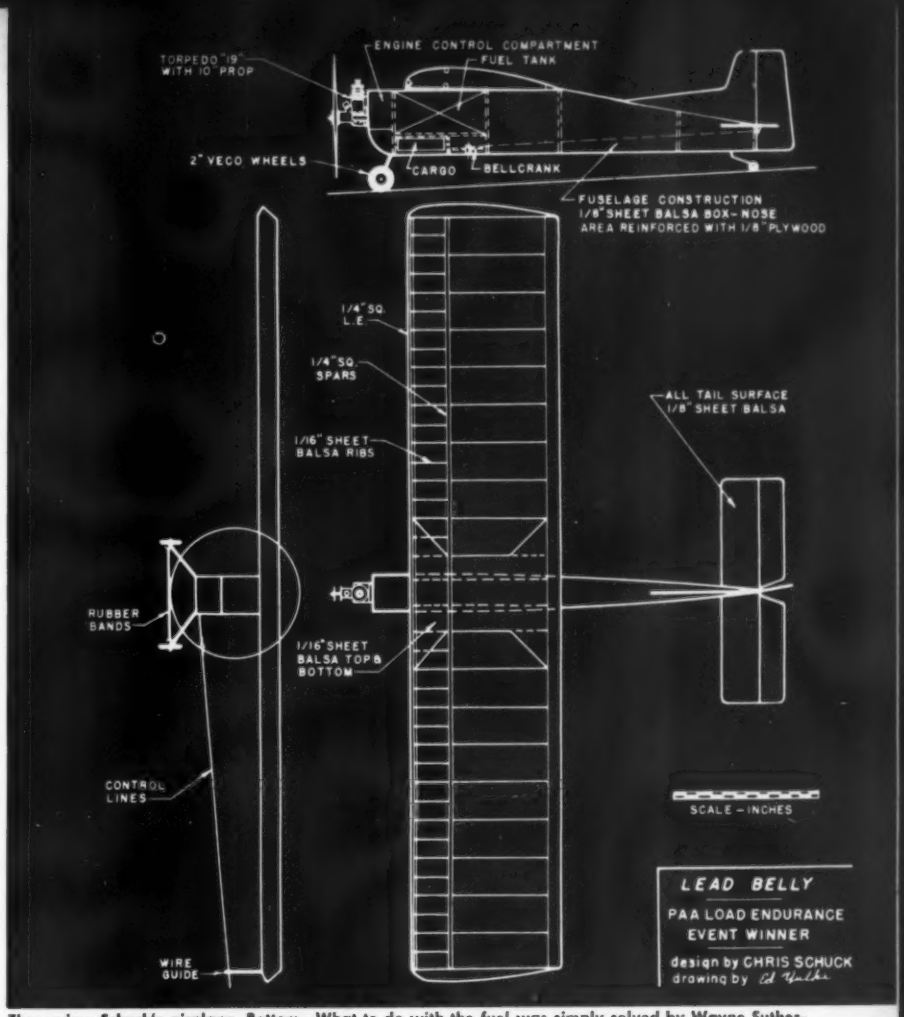
Last, but not least, in engine requirements, was the need for a reliable and easy-starting engine. I decided to use a new Torp. 19.

The last of my outright decisions affecting the basic plane design was related to the 4 lb. weight factor which included the fuel and the empty plane. I decided the plane structure and hardware would all have to be as light as possible to allow for as much fuel as possible. Any extra weight, either for extra strength or for looks, would have to be abandoned as each ounce would reduce the fuel supply accordingly. From past building experience I decided to shoot for a total weight of 36 oz. without the fuel, or 48 oz. of "cargo." This would allow for 28 oz. of fuel, or approximately 1-3/4 pints. To cover myself I installed a 1-qt. tank in case actual weight should be less than that estimated. The extra weight of this larger capacity tank would be only a fraction of an ounce and seemed justified.

After building the plane I found the following to be the actual weights, which all added up to the 112 oz. permitted by the rules:

Wing, 9 oz.; Body and Tail (including hardware), 14 oz., Engine with Special Mounting Plate, 7 oz.; Fuel Tank (1 qt.), 6 oz.; Required Cargo, 48 oz.; Fuel, 28 oz.

After assembling all the above data, I drew up the plans for the plane. By looking over the three view sketch you can see that no thought was given to looks or clean lines. The fuselage was given a short nose and tail moment arm only to keep the weight to a minimum. With the slow flying speeds expected, I did not figure on over-sensitive control. As it turned out, the plane handles like a U-Control Trainer and is extremely easy to control once flying speed is obtained. The exceptional depth of the fuselage was required to house the 1 qt. tank and the 48 oz. of dead weight. The center of the tank had to be close to the balance point of the entire plane. With this arrangement the change of fuel weight as the flight proceeded would not affect balance. The best place to locate the "cargo" was below the tank and up against the fire wall in a compartment surrounded by 1/8 in. plywood. The bottom piece of plywood ran



Three-view Schuck's airplane. Bottom—What to do with the fuel was simply solved by Wayne Sutherland with this Fox .29 powered six-footer. Just strap on the can, says he. Wayne racked up 4th place.

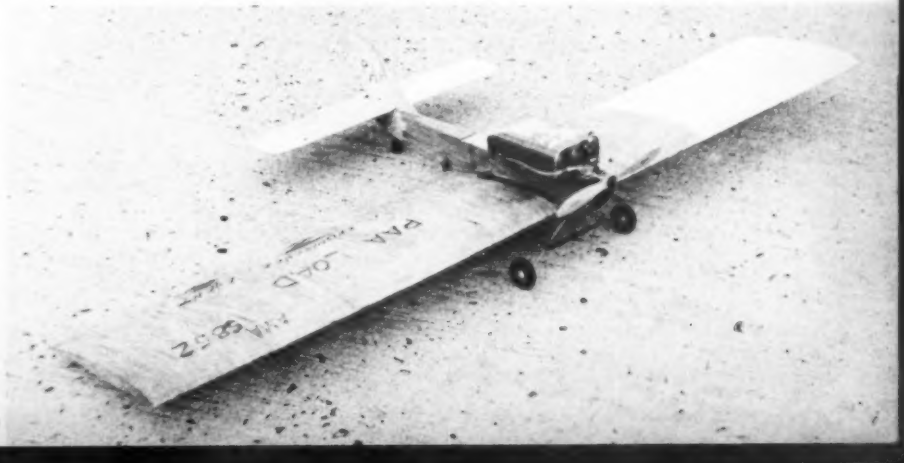
from the firewall back to a point where it supports the bellcrank and is is interlocked with the firewall and the vertical formers. This arrangement stows the cargo securely and allows for a trap door for cargo removal on the inboard side of the fuselage, the only safe place.

The landing gear was bent from a length of 1/8 in. music wire and had rubberbands stretched across the base from one wheel axle to the other to give additional strength and a shock absorbing action.

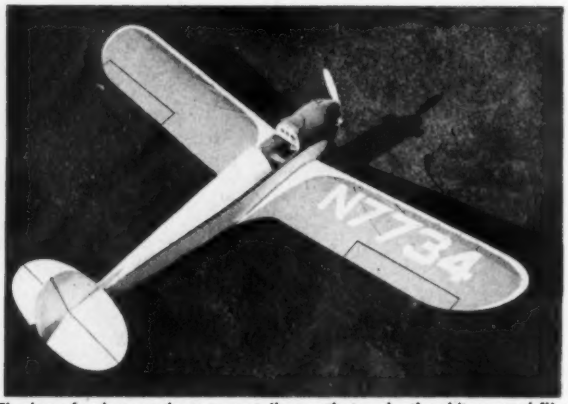
A freely rotating tail wheel allowed the plane to gather flying speed at the proper rate.

The flat bottom on the fuselage helps to keep the plane more level, closer to the flying position, and allows for faster take-off runs.

No dihedral is required in the wings, but the inboard wing should be slightly larger than that on the outboard side of the circle. (*Continued on page 36*)



Where's the pilot? With the exception of the added dihedral this crate is authentic scale. Rubber band attachment of flying wires takes the shocks. Slab sides and simple, pleasing lines make it natural for flying scale bugs. Big machine was one of the Oregon home-builts of the thirties.



The long fuselage and generous tail area that make the ship a good flier apparent in this interesting photo. Note cockpit details, stick, seat.

Just start the engine, hold tail like so, let go. Ships rolls into the prettiest take-off you'd ever want to see. Dog did not like Space Bug.

WIMPY ▶

by WALT MOONEY . . . . . *Les Long's famous Wimpy home-built light plane makes a corking subject for flying scale. Wing span is 37 inches, engines up to .049's.*

▶ Wanted! A scale model that has pleasing lines, is easily built, and will fly well free flight.

With these requirements in mind, Les Long's Longster Wimpy was selected. The consistent surface shapes and smooth curves, coupled with a slab-sided fuselage and low wing, fulfilled the first two requirements. The long tail moment and ample tail size indicated a model which would fly with but one modification. Dihedral was increased, this being the only deviation from exact scale.

For the detail hounds, the external cylinders and open cockpit provide that final touch. Without the cylinders and cockpit detail the model still makes an excellent sport type low-wing free flight.

Les Long, a home builder of note, produced at least four designs between 1928 and 1934, of which Wimpy is one of the prettiest. Powered with an Aeronca 26 horsepower engine it had good performance, due to clean lines. Wimpy is a rather simple scale job from the construction stand point and requires only a few remarks to clarify some fine points.

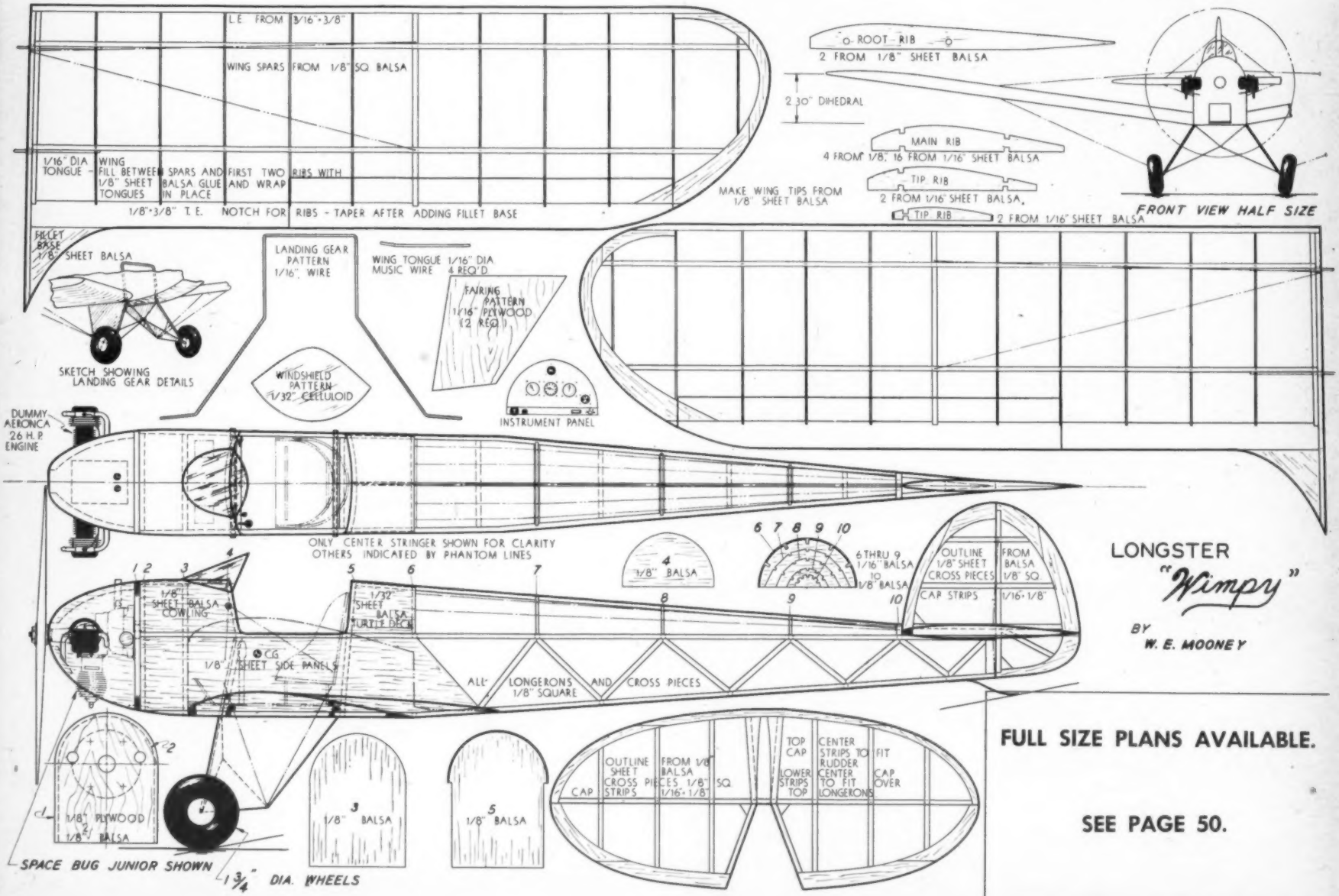
The fuselage is the conventional longeron, former, and stringer combination. Use very hard balsa for the longerons. One-eighth inch sheet fills between the longerons sides and bottom forward of the wing trailing edge. Wings are of conventional construction. Wing attachment is discussed later.

The horizontal and vertical tails are constructed flat, then 1/8 x 1/16 in. cap strips are added. Sand to a streamlined shape and a warp resistant tail results.

The landing gear is critical; it must be strong since it takes most of the hard knocks. Use a strong cement, Ambroid or equivalent, to cement the main wire into the fuselage. Install the wires shown in the front view and sketch. The lower aft wire goes through a hole in the fairing and is bent in a 3/32 in. diameter loop for a flying wire connection. Solder all wire joints. Wrap the main wire and fairing with silk or nylon to complete the job.

The wing attachment utilizes rubber tension on the flying wires to hold the wing and provide quick disconnects in case of collision. Four "S" hooks are required from .028 wire. Two hook into the loop at the bottom of the fairing to hold the lower flying wires, and two to connect the upper flying wires to the rubber band which runs through the tube in the fuselage half way up former #4. The wing tongues locate the wing on the fuselage with the correct incidence.

To keep the test flights tame use a 7 x 2 prop. It was found that a slight amount of up-thrust was required because of the high thrust line. The correct amount is indicated on the plans. Make sure there are no warps in wings or tail. If there is tall grass available test glides are in order. Otherwise, find a smooth take-off area and try low power, prop on backward, taxi tests increasing power until you get a take-off. Keep the turns shallow and to the left. END


L.E. FROM 3/16"×3/8"
WING SPARS FROM 1/8" SQ BALSA
1/16" DIA WING TONGUE - FILL BETWEEN SPARS AND 1/8" SHEET BALSA GLUE TONGUES IN PLACE
FIRST TWO RIBS WITH AND WRAP
1/8"×3/8" T.E. NOTCH FOR RIBS - TAPER AFTER ADDING FILLET BASE
ROOT RIB
2 FROM 1/8" SHEET BALSA
2.30" DIHEDRAL
MAIN RIB
4 FROM 1/8", 16 FROM 1/16" SHEET BALSA
TIP RIB
2 FROM 1/16" SHEET BALSA.
MAKE WING TIPS FROM 1/8" SHEET BALSA
FRONT VIEW HALF SIZE
FILLET BASE 1/8" SHEET BALSA
SKETCH SHOWING LANDING GEAR DETAILS
LANDING GEAR PATTERN 1/16" WIRE
WING TONGUE 1/16" DIA MUSIC WIRE 4 REQ'D
FAIRING PATTERN 1/16" PLYWOOD (2 REQ'D)
WINDSHIELD PATTERN 1/32" CELLULOID
INSTRUMENT PANEL
DUMMY AERONCA 26 H.P. ENGINE
ONLY CENTER STRINGER SHOWN FOR CLARITY OTHERS INDICATED BY PHANTOM LINES
1/8" SHEET BALSA COWLING
1/32" SHEET BALSA TURTLE DECK
1/8" SHEET SIDE PANELS
CG
ALL LONGERONS 1/8" SQUARE AND CROSS PIECES
4 1/8" BALSA
6 7 8 9 10
6 THRU 9 1/16" BALSA TO 1/8" BALSA
OUTLINE 1/8" SHEET CROSS PIECES
FROM BALSA 1/8" SQ
CAP STRIPS
1/16"×1/8"
1/8" PLYWOOD
1/8" BALSA
3 1/8" BALSA
5 1/8" BALSA
CAP
OUTLINE SHEET CROSS STRIPS
FROM 1/8" BALSA PIECES 1/8" SQ 1/16"×1/8"
TOP CAP
LOWER STRIPS TOP
CENTER STRIPS TO FIT RUDDER CENTER TO FIT LONGERONS
CAP OVER
SPACE BUG JUNIOR SHOWN
1 3/4" DIA. WHEELS

LONGSTER "Wimpy"

BY W. E. MOONEY

FULL SIZE PLANS AVAILABLE.

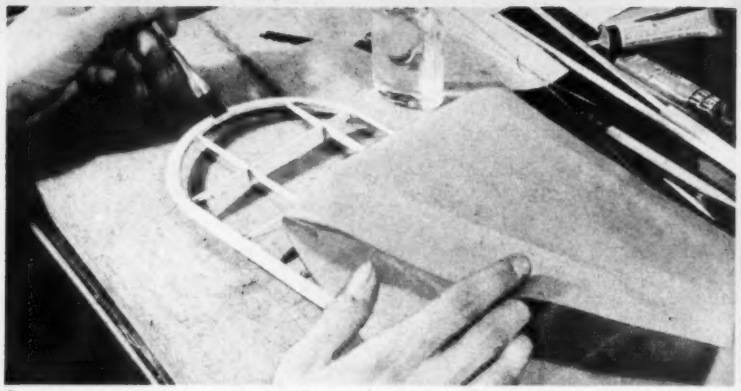
SEE PAGE 50.

HOW... to Cover

A MAN How-To-Do-It

by ART SILBERBERG

The covering job can make or it can break the appearance of the airplane. Done right, it's easy.



1. With grain running spanwise cut the panels oversize, allowing for trim. Attach paper to center rib with dope, then to spot (note brush) at tip. Pull paper tight to adhere to spot.

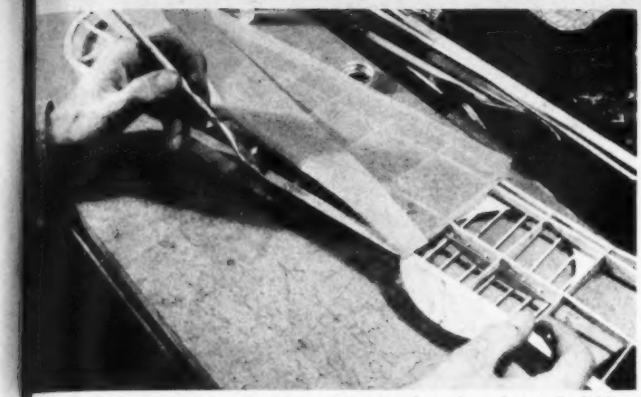
4. Before dope has thoroughly dried make sure the tissue is smooth; pull out any wrinkles, grasping the extra paper along the edges. Don't pull the paper drum tight at this stage.

7. Underside of previous operation shows how one small section of extra edging at a time is doped down. Smooth with finger to avoid wrinkles.

8. For best results a spray gun should be used for wetting tissue, but a wad of cotton, Kleenex will do. Paper shrinks when dry, is doped.

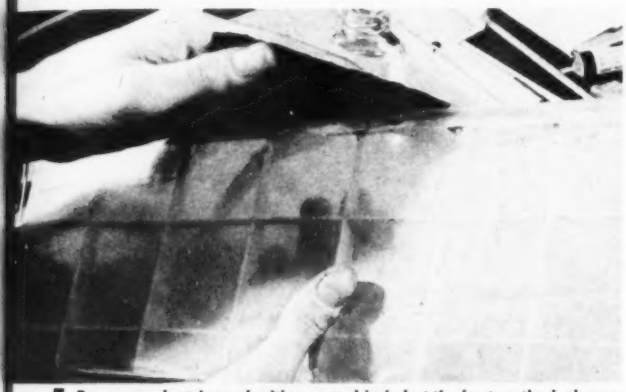
11. Dope one down, then other, as on wing. Trim with razor blade. If tissue does not adhere at any point, rewet area, and dope down.

12. After fuselage surface is doped, any remaining covering details are finished. On scale job. Stringered planes, trimming details vary.

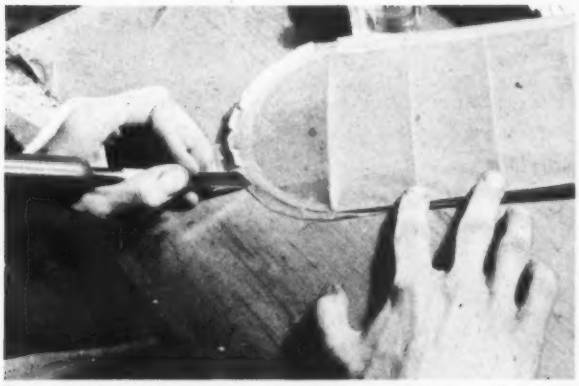


2. Operation just described forms triangle where tissue is attached. Now fold back the tissue, dope one edge at a time in place along edges.

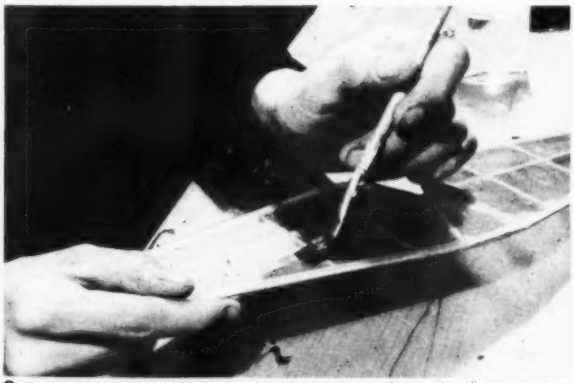
3. After tissue has adhered, a really good bond is achieved by doping edges again, smoothing with finger to make dope seep through.



5. Paper may be trimmed with a razor blade but the best method, shown, is to run fine sandpaper along the edges. This makes a neat, clean cut.



6. If color dope to be used, trim tips flush. If no color dope, allow extra paper as shown, then dice it with razor blade, fold under, dope.



9. Doping wing, tail done in progressive areas, alternating between top, bottom to avoid warps. For rubber job like this, two coats clear.

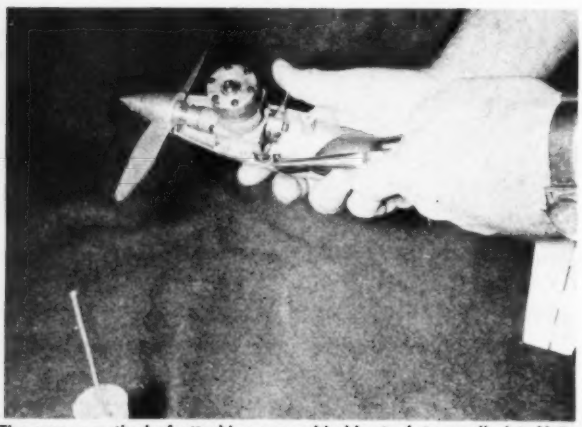
10. If Silkspan type tissue used, fuselage can be wet covered. Lay paper on towel, wet, transfer to frame. Frame doped first, allowed to dry.

13. When lifting tissue to be removed, be careful not to rip adjoining covering. Paper sticks to framework automatically when doped.

Editor's Note—This is the third in a series of pictorials showing assembly of a typical kit, in this case a Berkeley Fairchild. Painting and finishing reviewed in next issue.

High wing or midwing, both fly differently, have their pros and cons. This high wing type was caught at moment of release at Mirror Flying Fair.

Young Mirror contestant checks ship in dolly, incidentally of similar design to one illustrated with this article. Dolly is mighty important!



The proper method of attaching a pen bladder tank to needle jet. Note how close you hold to the end of the tubing with the needle nose pliers.

Pen bladder tank hook-up on a front rotary engine, Fox .19 illustrated. Homemade back case cover was built to boost the crankcase compression.

WHAT'S NEW in SPEED?

by LEO HOLLIDAY

There are several very good speed designs available to the average modeler that are good enough to get better than average speeds. For some reason, Joe Modeler has a very difficult time between the finished airplane and walking over to the timer and picking up his speed results. Most articles and kits deal in generalities and never pin point the *little things* that count so much toward the final results.

This article is an attempt to let Joe Modeler get in there and give names like H. deBolt, Lou Mahieu, Frank Stone, Clem and Beasley, Tommy Baker, Hall and Massey, Herbert L. Davis, and Mark Brown a real run for their money.

Leland Mortin of Dallas, Texas, who before the record trials in Dallas on January 31 and February 21 was just Joe Modeler that loved to fly combat and stunt and was a fair hand in free-flight, is now the new record holder (at the time of writing—Editor) in Open Class C speed. He took a stock McCoy .60, a very clean airplane, OK glow plug, Fairebend's This-Is-It fuel (borrowed), a stock 9 x 12 Tornado prop and turned 155.11 MPH on his first flight. On January 21, he did 160.51 MPH for a new national record. It can be done!

Various types of constructions are used to obtain the basic speed model designs, but the main difference lies in the materials used, such as metal or wood wings, elevators, or pans. As a novice in speed, many fellows run into difficulties of construction. Actually, a speed ship is one of the easiest and quickest type models to build once the pattern of building is established.

The following is an attempt to describe the various types of construction and the reasons behind them. The starting point of all speed models is the bottom half or the speed pan. There has been an almost universal transition to the aluminum or magnesium cast speed pan. The wooden pan has several disadvantages that outweigh their one advantage of low weight. Wooden pans get oil soaked easily, tend to vibrate loose if a maple crutch type construction is used and quite generally give engine mounting troubles. A metal pan is most desirable for the beginner and expert alike. It provides the advantage of a flat surface for mounting the engine, reduces vibration through the solid mounting, and is durable in crack-ups. Once the drilling and tapping of the pan have been accomplished, the model builder has little worry over keeping his engine bolted down tight.

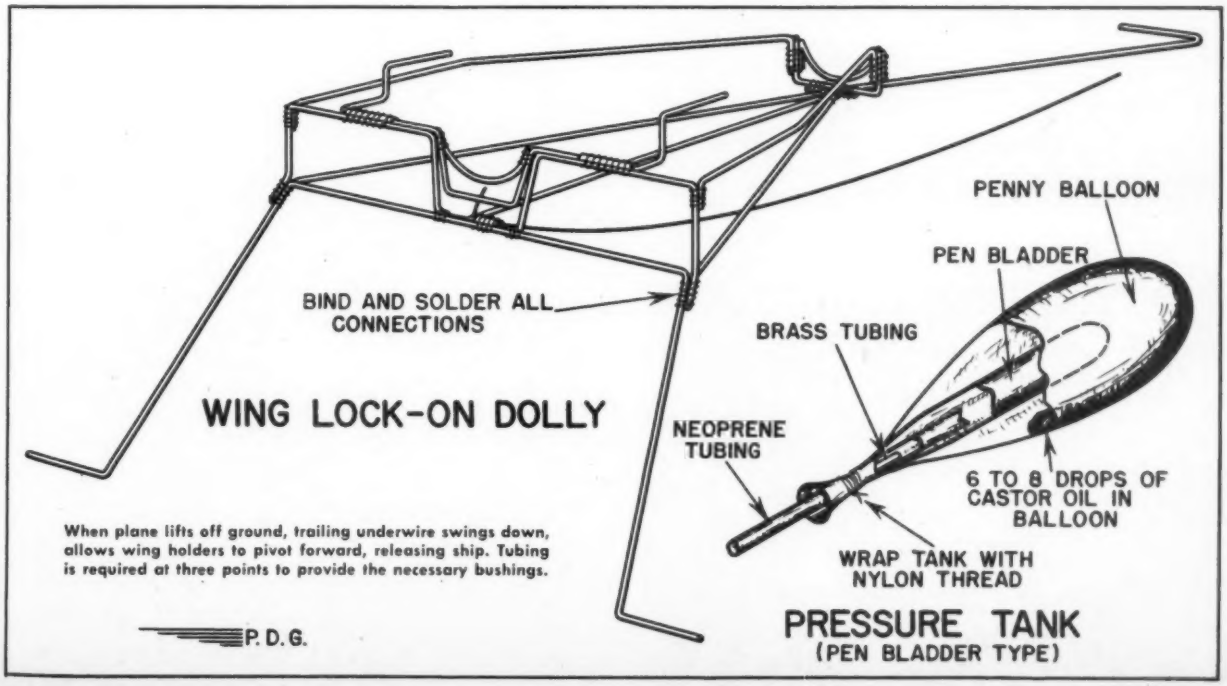
The greatest difficulty for a beginner lies in the drilling and tapping of metal pans. The important things to remember are: 1st—Be sure that the engine is flat on the mounting surface (many times the front part of the engine touches the pan and does not allow the engine to mount flat, and the pan must be ground away just a little) and, 2nd—The engine position should be determined as to mounting it straight forward or inset just a few degrees toward the center of the circle.

The mounting hole should be marked in such a way that the center of the hole may be center punched to insure drilling at the correct location. These holes should be drilled undersize from the final tap drill size. A good size to use in this pre-drilling operation is a number 50 drill. In mounting a .19 or a .29 engine, 4-40 machine bolts are recommended. The tap size drill is a number 43. Sixties should be mounted with 6-32 machine bolts which require a number 36 tap drill. These sizes are almost universal in speed flying.

Care should be taken to drill the holes vertical. In the tapping operation, always remember to fill the hole with machine oil and do not try to tap all of the hole on the first operation. The tap should be run in and out of the hole each time that metal begins to bind around the tap. This will eliminate the chance of breaking the tap off in the hole. Care should also be taken to try not to bend the tap as it is made of castings and breaks very easily under this sort of strain. (*Continued on page* 48)

Typical Texas speed job, a Dooling .29 powered ship by Bill Timmons. It turned 142.4 mph in Class B Open. Metal wings and stabilizer show up.

Speed records were shattered like clay pigeons in Texas this past season. You, too, can turn top times, claims this well known Texas flier, in the first of two terrific articles.


BIND AND SOLDER ALL CONNECTIONS
WING LOCK-ON DOLLY
When plane lifts off ground, trailing underwire swings down, allows wing holders to pivot forward, releasing ship. Tubing is required at three points to provide the necessary bushings.
P. D. G.
PENNY BALLOON
PEN BLADDER
BRASS TUBING
NEOPRENE TUBING
6 TO 8 DROPS OF CASTOR OIL IN BALLOON
WRAP TANK WITH NYLON THREAD
PRESSURE TANK
(PEN BLADDER TYPE)

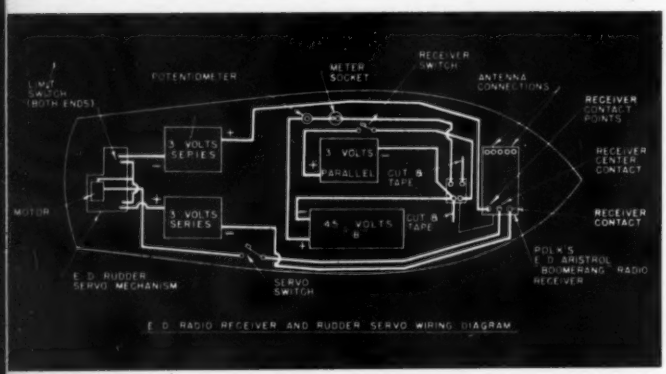
Renowned for his many fine airplane designs, Walt built this splendid cabin cruiser to enjoy leisurely RC work. Note receiver in the bow.

Proportionate left-right rudder by means of ED servo was thrill, said author, after his first cruise. Actually, any standard equipment is ok.

HIGGINS CABIN CRUISER...

by WALTER MUSCIANO

For the many airplane builders who dabble in boats, especially the radio men, this truly beautiful scale craft is highly recommended.



E. D. RADIO RECEIVER AND RUDDER SERVO WIRING DIAGRAM

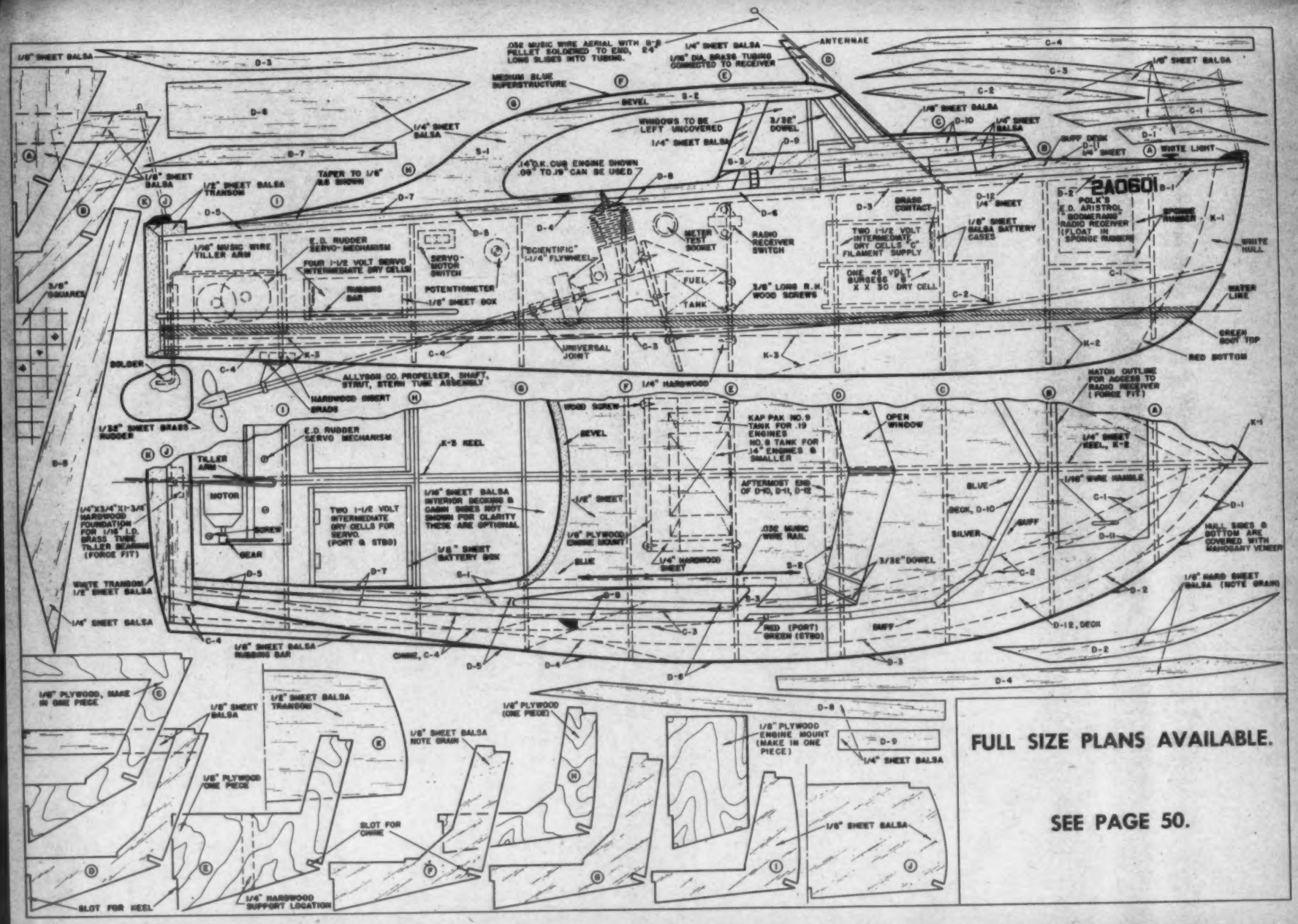
Inboard mounted engine makes it advisable to leave off windows, as was done with this model. Water-cooled marine engines can also be employed.

It was decided that our model had to have beautiful lines and yet be spacious enough inside to permit easy accessibility to radio equipment as well as the powerplant. The fact that we are primarily model plane enthusiasts called for a glow plug engine. It then became imperative to use a design that would allow as much cooling air as possible to circulate around the engine. The last and, perhaps, the most important requirement was easy construction that would be rugged enough to withstand severe abuse. This meant that compound curves were not permissible in order to allow sheet mahogany veneer covering to be used. This is stronger, more watertight, and easier to install than the more complex planking.

Fulfilling these requirements was a neat looking Higgins cabin cruiser designed after the war by the builders of the famous PT boats. It has a hull that is very similar to these torpedo craft. The cabin windows are extremely large which aids in keeping the engine cool. By leaving these windows open, air is allowed to circulate through the cabin.

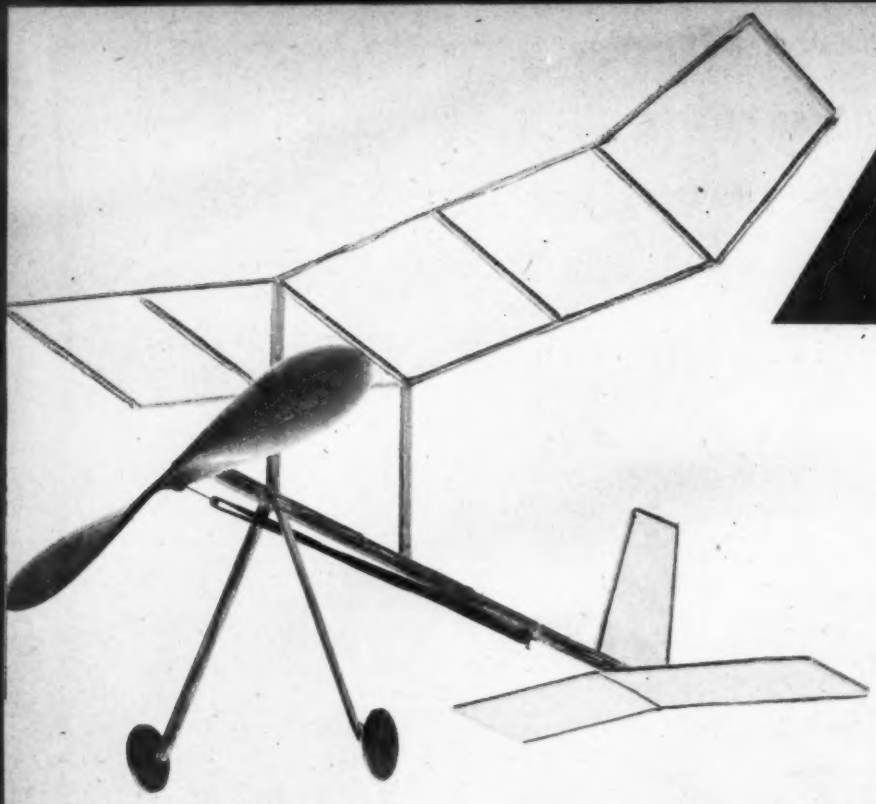
Any glow plug or diesel engine of from .099 to .19 cubic inch displacement can be fitted. For extremely high speeds, the hull design, shape, and size will accommodate a .29 safely. Those who desire an electric motor should select a six volt motor of the larger variety. This will not, however, produce high speeds.

We used an E.D. Aristrol single channel transmitter and receiver in conjunction with an E.D. rudder servo unit in order to attain true proportional control and a Ripmax "beep box." The advantages of proportional rudder control far overshadow the escapement type of *(Continued on page 52)*


.032 MUSIC WIRE AERIAL WITH 0-9 PELLET SOLDERED TO END, E-9 LONG SLIDES INTO TUBING.
1/4" SHEET BALSA
1/16" DIA. BRASS TUBING CONNECTED TO RECEIVER
ANTENNAE
MEDIUM BLUE SUPERSTRUCTURE
BEVEL
WINDOWS TO BE LEFT UNCOVERED
3/32" DOWEL
1/4" SHEET BALSA
1/16" SHEET BALSA
1/4" SHEET BALSA
TAPER TO 1/8" AS SHOWN
1/2" SHEET BALSA TRANSOM
1/16" MUSIC WIRE TILLER ARM
E.D. RUDDER SERVO-MECHANISM
FOUR 1-1/2 VOLT SERVO INTERMEDIATE DRY CELLS
RUDDER BAR
SERVO-MOTOR SWITCH
POTENTIOMETER
1/8" SHEET BOX
.14 O.K. CUB ENGINE SHOWN .09 TO .19 CAN BE USED
"SCIENTIFIC" 1-1/4" FLYWHEEL
METER TEST SOCKET
RADIO RECEIVER SWITCH
FUEL TANK
3/8" LONG R.H. WOOD SCREWS
UNIVERSAL JOINT
BRASS CONTACT
TWO 1-1/2 VOLT INTERMEDIATE DRY CELLS "C" FILAMENT SUPPLY
ONE 45 VOLT BURGESS B X X 30 DRY CELL
1/8" SHEET BALSA BATTERY CASES
POLK'S E.D. ARISTROL "BOOMERANG" RADIO RECEIVER (FLOAT IN SPONGE RUBBER)
SPONGE RUBBER
WHITE LIGHT
WHITE HULL
WATER LINE
GREEN BOOT TOP
RED BOTTOM
SOLDER
ALLYSON CO. PROPELLER SHAFT, STRUT, STERN TUBE ASSEMBLY
HARDWOOD INSERT
BRADS
1/4" HARDWOOD
WOOD SCREW
BEVEL
KAP PAK NO. 9 TANK FOR .19 ENGINES NO. 8 TANK FOR .14" ENGINES & SMALLER
OPEN WINDOW
HATCH OUTLINE FOR ACCESS TO RADIO RECEIVER (FORCE FIT)
1/32" SHEET BRASS RUDDER
E.D. RUDDER SERVO MECHANISM
K-3 KEEL
TILLER ARM
MOTOR
SCREW
GEAR
1/16" SHEET BALSA INTERIOR DECKING & CABIN SIDES NOT SHOWN FOR CLARITY THESE ARE OPTIONAL
TWO 1-1/2 VOLT INTERMEDIATE DRY CELLS FOR SERVO. (PORT & STBD)
1/8" SHEET BATTERY BOX
1/4"X3/4"X1-3/4" HARDWOOD FOUNDATION FOR 1/16" I.D. BRASS TUBE TILLER BEARING (FORCE FIT)
WHITE TRANSOM 1/2" SHEET BALSA
1/4" SHEET BALSA
1/16" PLYWOOD ENGINE MOUNT
1/4" HARDWOOD SHEET
.032 MUSIC WIRE RAIL
AFTERMOST END OF D-10, D-11, D-12
BLUE
DECK, D-10
SILVER
SHEER
RED (PORT) GREEN (STBD)
3/32" DOWEL
1/4" SHEET BALSA KEEL, K-2
1/16" WIRE HANDLE
HULL SIDES & BOTTOM ARE COVERED WITH MAHOGANY VENEER
1/8" HARD SHEET BALSA (NOTE GRAIN)
D-12, DECK
1/8" PLYWOOD, MAKE IN ONE PIECE
1/8" SHEET BALSA
1/8" SHEET BALSA TRANSOM
1/8" SHEET BALSA NOTE GRAIN
1/8" PLYWOOD (ONE PIECE)
1/8" PLYWOOD ENGINE MOUNT (MAKE IN ONE PIECE)
SLOT FOR CHINE
SLOT FOR KEEL
1/4" HARDWOOD SUPPORT LOCATION

FULL SIZE PLANS AVAILABLE.

SEE PAGE 50.



ZIPPY

by JOHN ZAIC

When the weather is bad, rack this little ROG around the living room—heh, shut off that vacuum cleaner! And, on the serious side, it's a perfect project for new modelers. No prop carving.

What's the ceiling? The ceiling, of course, and the higher, the better. Guys with Victorian living rooms should have it over apartment dwellers.

▸ No flying field? Raining? Windy? Don't let that stop your flying. If you have a room that is about 10 ft. square, it is large enough for Zippy. This ROG (rise-off-ground) quickly takes off from the floor and climbs up almost vertically in tight circles. It is rugged but must be handled carefully. If anything breaks, just cement the broken parts together and keep on flying.

The rudder is built first to get practice in the building procedure. Rub a little piece of dry soap on the rudder drawing. This will prevent the work from sticking to the drawing and you will be able to use the drawing over and over again. Place a piece of 1/16 inch square balsa on the drawing and with a new razor blade carefully cut it to the same size and corner shape as one of the sides. Do the same with the other three sides. Lay one side down in place on the drawing. Put some coins or weight on it to keep it in place. Put a drop of cement on the end of the next corresponding side and carefully put it in place against the first piece on the drawing. Weigh it down also. The operation is continued until the rudder is finished.

The same procedure is followed in making the stabilizer and the two wing panels. The ribs are cut to size first. The bent-back balsa strips are made by nicking them slightly with a razor blade at the desired place, then bending the wood until it cracks but still holds together; then immediately apply a coat of cement around the joint to hold it in shape.

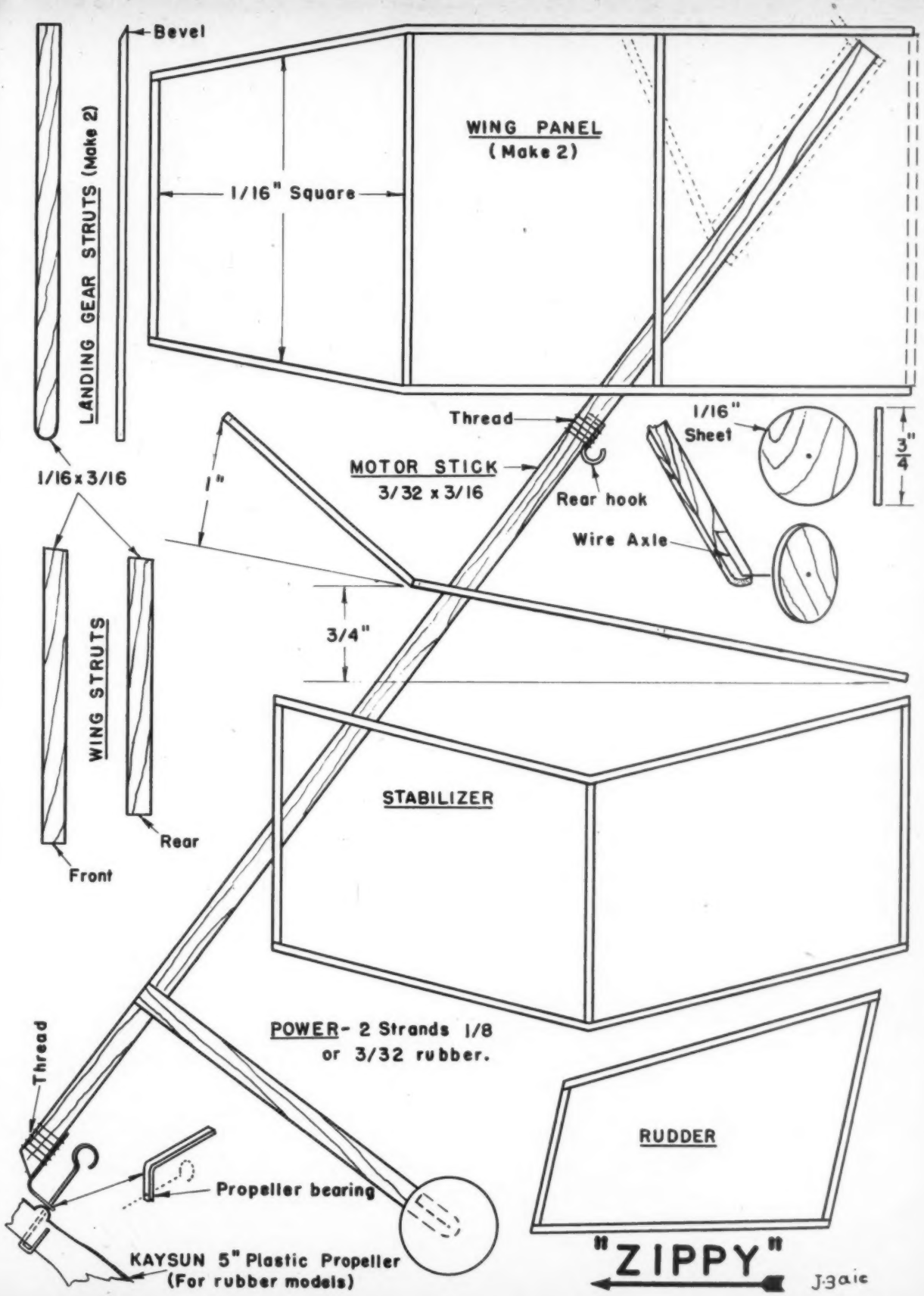
In making the two wing panels do not put in the rib that is shown dotted. After a flat wing panel is made, the wing tip is bent up by nicking, bending and cementing at the desired location. After two wing panels are made with the tips bent up, they are joined with cement together with the center rib. Note that the panels are at an angle just like the wing tips. Use little weights and little blocks to raise them to the desired height.

Wire parts are minimized by use of balsa strips for wing mounting and the landing gear. But, by gosh, don't dope, watershrink paper covering.

Cover the wing, stabilizer and rudder with tissue paper. Nail polish, if available, is excellent for cementing the paper to the framework. Do not dope or use water on the tissue. Repeat: don't dope or water shrink.

The wheels are made of 1/16 or 3/32 inch balsa sheet. The wood is placed between two pennies so that it can be cut and sanded round. Use the drawing to get the center hole location. Put a drop of cement on each side of the hole and when it is dry punch a hole through again with a pin. The wire axle to hold the wheel can be made from a small straight pin. The wheel is put on the axle which is then cemented to the landing gear struts.

Cut the motor stick, landing gear struts and wing struts to size. Notice the bevel on one end of the landing gear strut where it will be cemented to the motor stick. Small size paper clips straightened out may be used to make the propeller shaft and the rear hook to hold (*Continued on page* 51)


Bevel
LANDING GEAR STRUTS (Make 2)
1/16" Square
WING PANEL
(Make 2)
1/16x3/16
Thread
MOTOR STICK
3/32 x 3/16
Rear hook
1/16"
Sheet
3/4"
1"
Wire Axle
3/4"
WING STRUTS
Front
Rear
STABILIZER
POWER- 2 Strands 1/8
or 3/32 rubber.
Thread
Propeller bearing
KAYSUN 5" Plastic Propeller
(For rubber models)
RUDDER
"ZIPPY"
J.Gaic

Notes on RC Installations

Large side doors with roofed-over cabins were the vogue a few years ago but now the trend is to solid, windowless sides and open cabin tops.

by JOHN SPRAGUE

Directions tell how to operate a radio but after that you are pretty much on your own. Here're a few good, thoroughly tried practical ideas.

Below—You, too, would be perplexed if you had an installation problem like this one. Note division between battery section, radio and servos.

▸ What is a good radio installation?

Obviously, it must be neat to insure receiver reliability. And it should incorporate other desirable qualities.

For example, it should be convenient to tune and check. It should be accessible, especially for battery replacement. It should protect the equipment in the most violent crack-ups and it should protect the airplane structure from damage by the radio or the batteries.

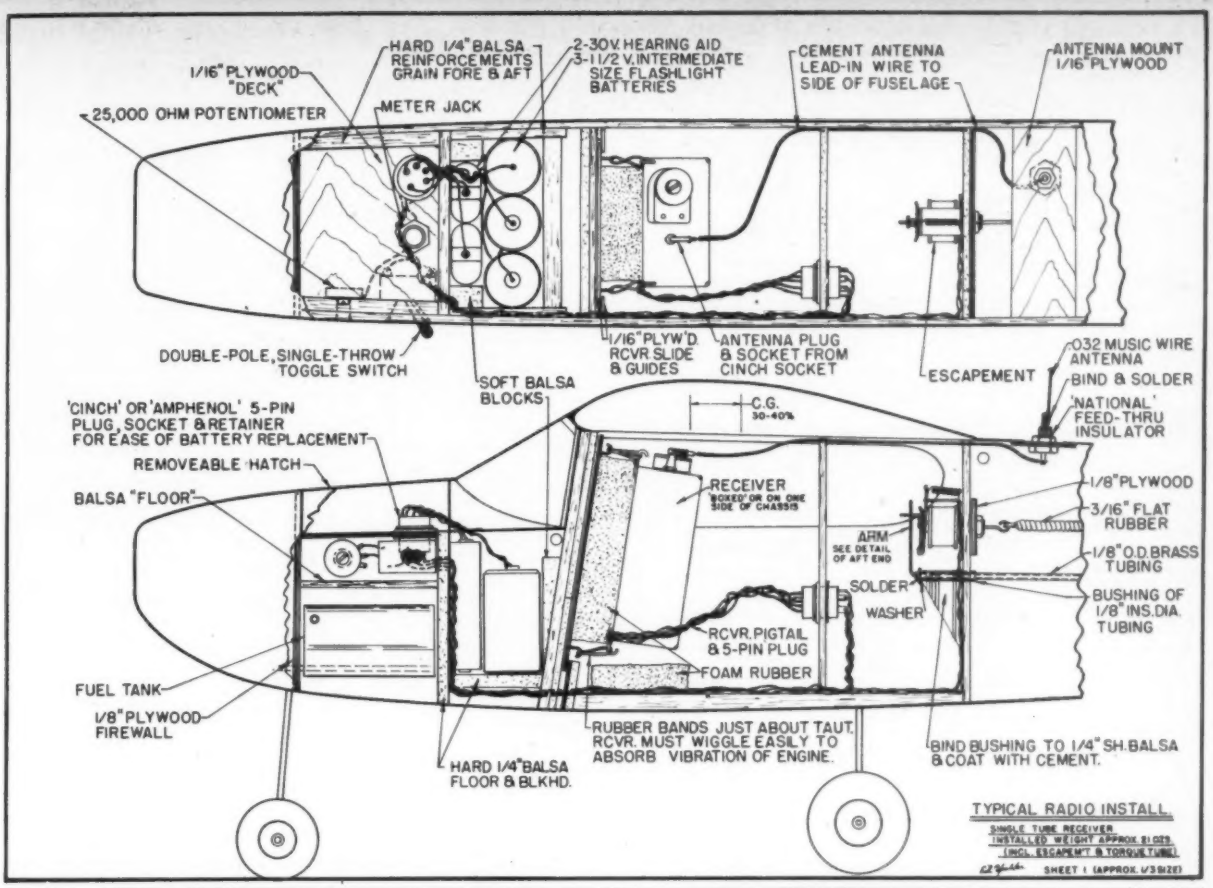
Before beginning construction of the plane, it is advisable to visualize the location of receiver, escapement, linkage, batteries and any switches, jacks or potentiometers. To do otherwise often has the same effect as painting one's self into a corner with resulting trouble breeding compromises.

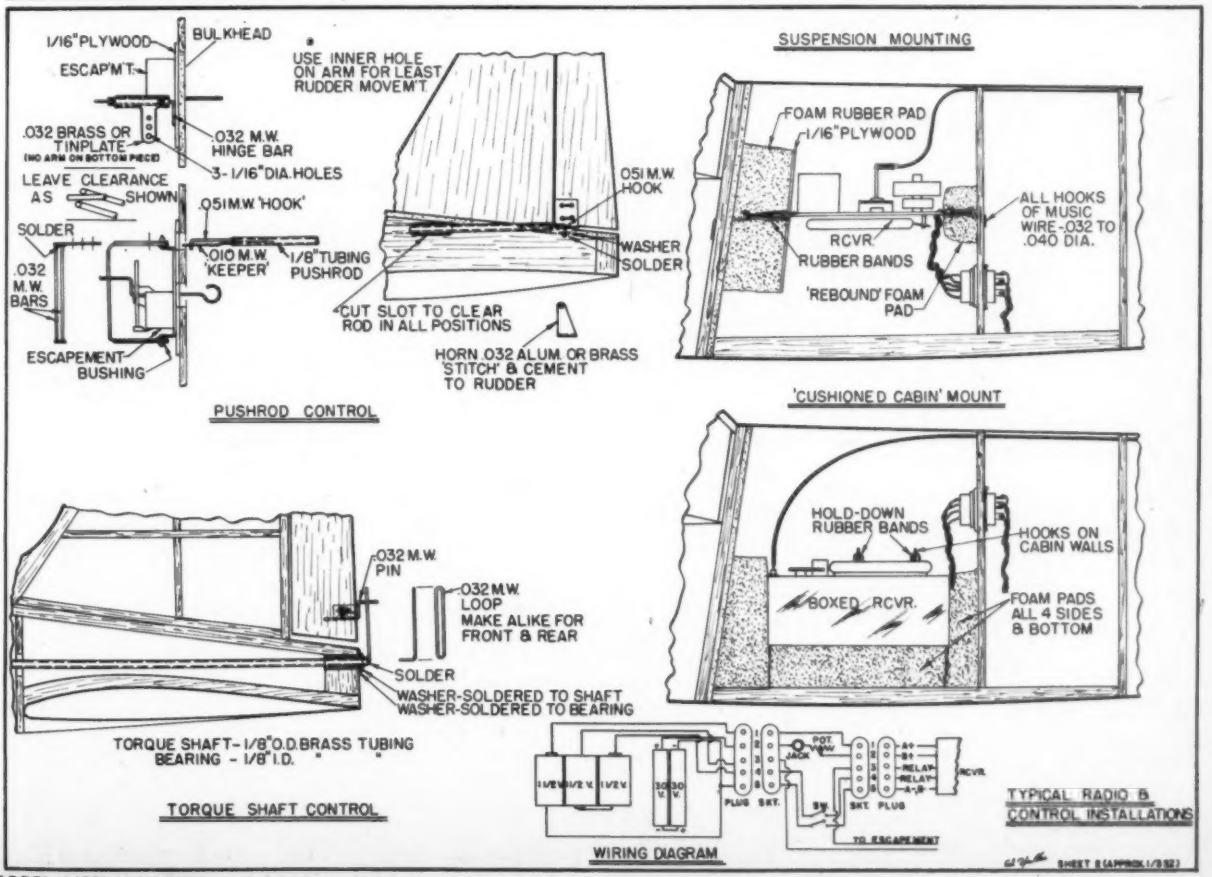
Receiver Location: Installations boil down to three popular methods. One is to suspend the receiver by rubberbands. Some receivers do not really lend themselves to any other installation because of their two-sides-of-the-chassis layout. Others, having low relay operation current values, require this loose mounting in more powerful models where vibration would be a problem. Multi-channel sets are rather heavy to suspend in such fashion.

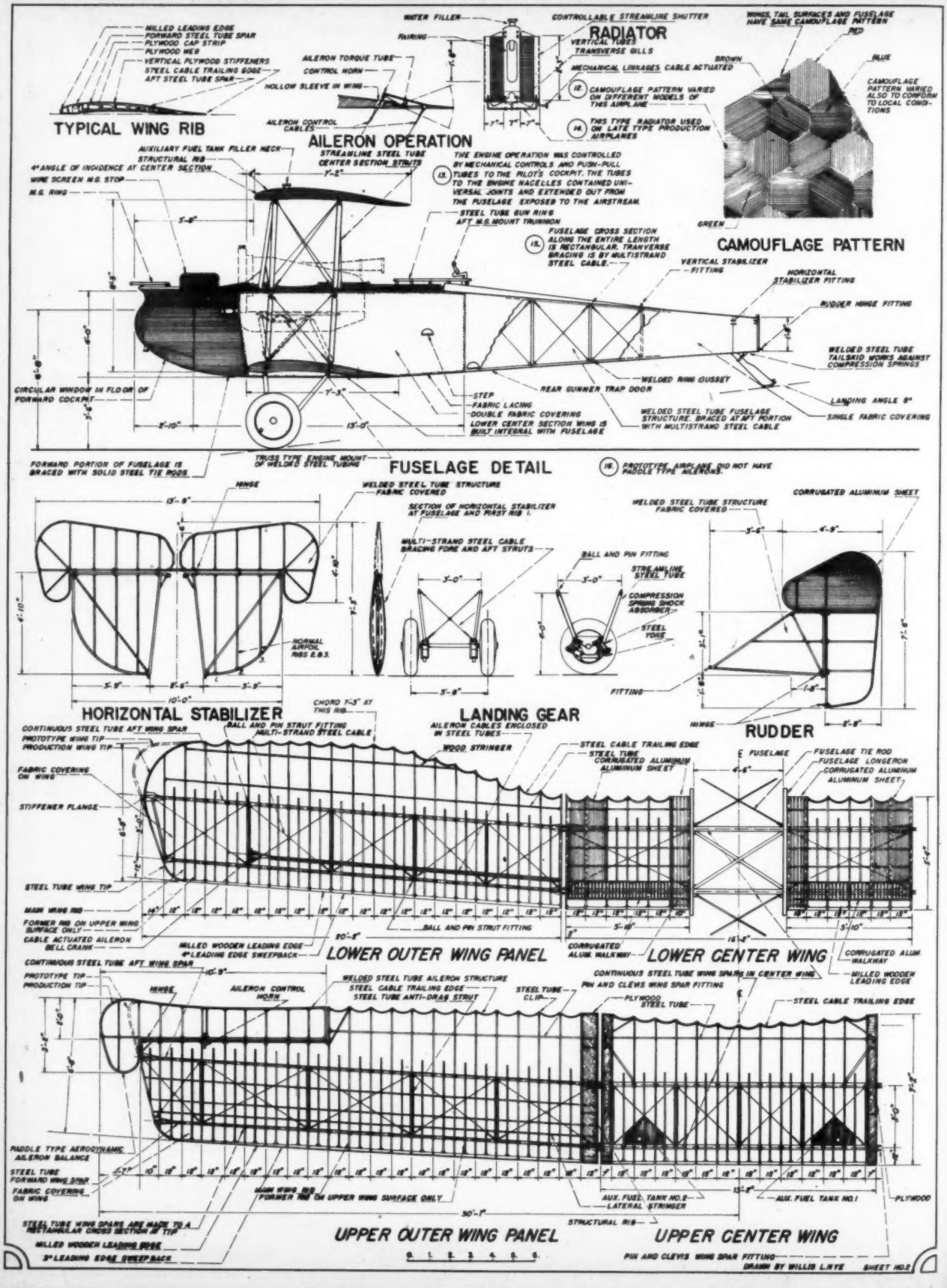
When rubberband suspension must be used, it is imperative that a tether be attached to the receiver and to some firmly anchored object to the rear, such as a wing hold-down dowel. Also, place a block of foam rubber between the receiver and the front cabin bulkhead. The tether prevents the receiver from shooting forward in a crack-up. Rubber-mounted receivers frequently suffer damage on the recoil when they strike the rear of the cabin.

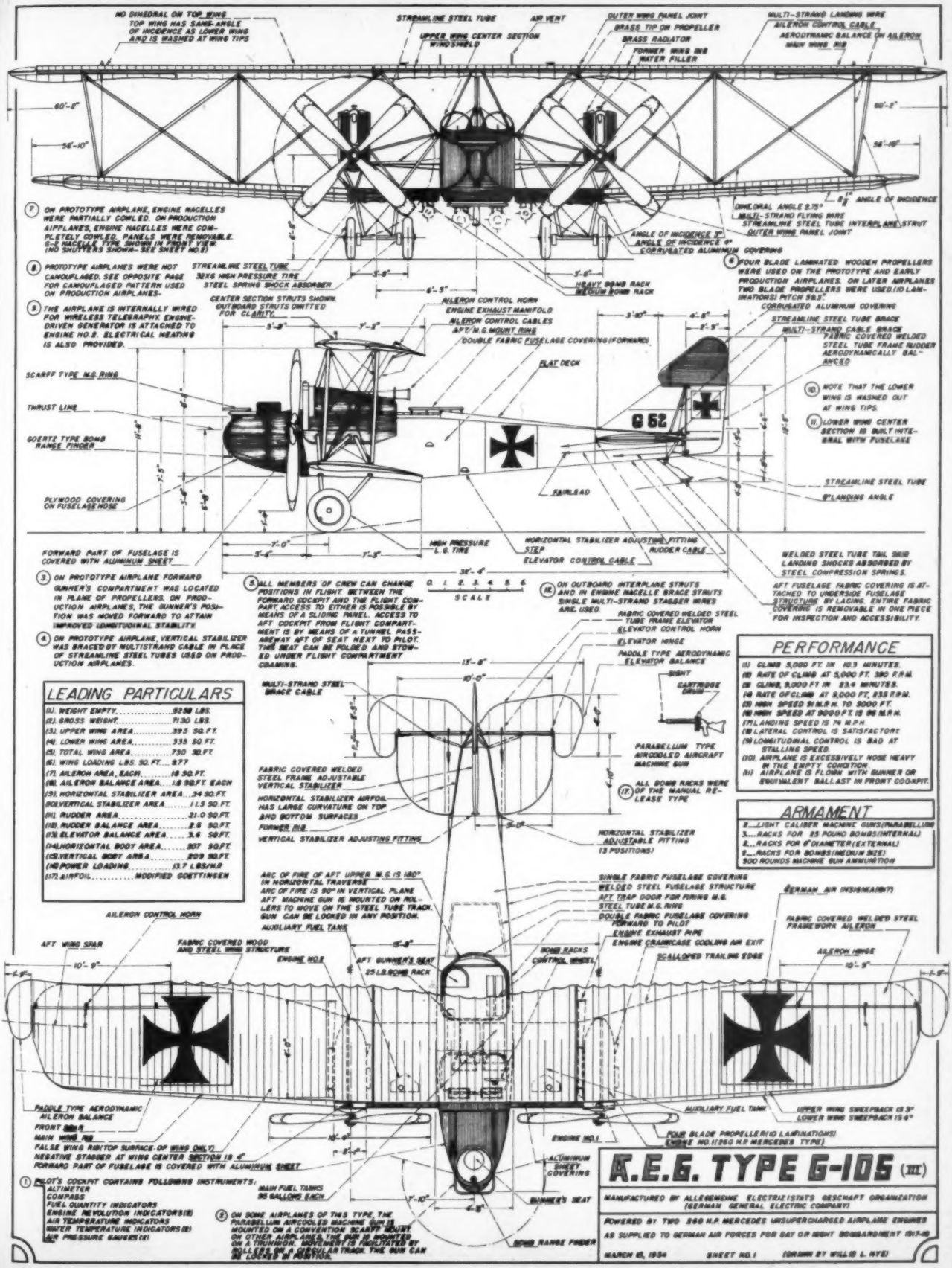
Then there are the many variations on horizontal mounting, where the chassis ends or sides attach to thin ply, cemented to foam rubber blocks for shock absorbing. This arrangement may be desirable when the receiver is relatively large for the airplane, or where weight prohibits other mounting methods.

Lastly comes the vertical mounted receiver, placed against the front cabin bulkhead. A block of foam rubber (not sponge) provides shock absorption. Rubberbands from the chassis corners to four hooks hold the receiver in place. Or it may be so mounted upon a plywood slide, which makes the unit instantly removable. The overwhelming majority of receivers lend themselves to this arrangement. Great resistance to damage recommends (*Continued on page 50*)


1/16" PLYWOOD "DECK"
HARD 1/4" BALSA REINFORCEMENTS GRAIN FORE & AFT
2-30 V. HEARING AID 3-1 1/2 V. INTERMEDIATE SIZE FLASHLIGHT BATTERIES
CEMENT ANTENNA LEAD-IN WIRE TO SIDE OF FUSELAGE
ANTENNA MOUNT 1/16" PLYWOOD
25,000 OHM POTENTIOMETER
METER JACK
DOUBLE-POLE, SINGLE-THROW TOGGLE SWITCH
SOFT BALSA BLOCKS
1/16" PLYW'D RCVR. SLIDE & GUIDES
ANTENNA PLUG & SOCKET FROM CINCH SOCKET
ESCAPEMENT
.032 MUSIC WIRE ANTENNA
BIND & SOLDER
'NATIONAL' FEED-THRU INSULATOR
'CINCH' OR 'AMPHENOL' 5-PIN PLUG, SOCKET & RETAINER FOR EASE OF BATTERY REPLACEMENT
C.G. 30-40%
REMOVEABLE HATCH
BALSA "FLOOR"
RECEIVER 'BOXED' OR ON ONE SIDE OF CHASSIS
1/8" PLYWOOD
3/16" FLAT RUBBER
ARM SEE DETAIL OF AFT END
1/8" O.D. BRASS TUBING
SOLDER
WASHER
BUSHING OF 1/8" INS. DIA. TUBING
RCVR. PIGTAIL & 5-PIN PLUG
FOAM RUBBER
FUEL TANK
1/8" PLYWOOD FIREWALL
RUBBER BANDS JUST ABOUT TAUT. RCVR. MUST WIGGLE EASILY TO ABSORB VIBRATION OF ENGINE.
BIND BUSHING TO 1/4" SH. BALSA & COAT WITH CEMENT.
HARD 1/4" BALSA FLOOR & BLKHD.
TYPICAL RADIO INSTALL.
SINGLE TUBE RECEIVER INSTALLED WEIGHT APPROX. 2 1/2 OZS. (INCL. ESCAPEM'T & TORQUE TUBE)
SHEET 1 (APPROX. 1/3 SIZE)


1/16" PLYWOOD
BULKHEAD
ESCAP'M'T.
.032 BRASS OR TINPLATE (NO ARM ON BOTTOM PIECE)
.032 M.W. HINGE BAR
3-1/16" DIA. HOLES
LEAVE CLEARANCE AS SHOWN
.051 M.W. 'HOOK'
SOLDER
.032 M.W. BARS
.010 M.W. 'KEEPER'
1/8" TUBING PUSHROD
ESCAPEMENT BUSHING
USE INNER HOLE ON ARM FOR LEAST RUDDER MOVEM'T
.051 M.W. HOOK
WASHER SOLDER
CUT SLOT TO CLEAR ROD IN ALL POSITIONS
HORN .032 ALUM. OR BRASS 'STITCH' & CEMENT TO RUDDER
PUSHROD CONTROL
SUSPENSION MOUNTING
FOAM RUBBER PAD
1/16" PLYWOOD
ALL HOOKS OF MUSIC WIRE-.032 TO .040 DIA.
RCVR. RUBBER BANDS
'REBOUND' FOAM PAD
'CUSHIONED CABIN' MOUNT
HOLD-DOWN RUBBER BANDS
HOOKS ON CABIN WALLS
BOXED RCVR.
FOAM PADS ALL 4 SIDES & BOTTOM
.032 M.W. PIN
.032 M.W. LOOP MAKE ALIKE FOR FRONT & REAR
SOLDER
WASHER-SOLDERED TO SHAFT
WASHER-SOLDERED TO BEARING
TORQUE SHAFT-1/8" O.D. BRASS TUBING
BEARING - 1/8" I.D. "
TORQUE SHAFT CONTROL
WIRING DIAGRAM
TYPICAL RADIO & CONTROL INSTALLATIONS
SHEET 2 (APPROX. 1/3 SIZE)


TYPICAL WING RIB
MILLED LEADING EDGE
FORWARD STEEL TUBE SPAR
PLYWOOD CAP STRIP
PLYWOOD WEB
VERTICAL PLYWOOD STIFFENERS
STEEL CABLE TRAILING EDGE
AFT STEEL TUBE SPAR
AILERON OPERATION
AILERON TORQUE TUBE
CONTROL HORN
HOLLOW SLEEVE IN WING
AILERON CONTROL CABLES
RADIATOR
WATER FILLER
FAIRING
CONTROLLABLE STREAMLINE SHUTTER
VERTICAL TUBES
TRANSVERSE GILLS
MECHANICAL LINKAGES CABLE ACTUATED
12. CAMOUFLAGE PATTERN VARIED ON DIFFERENT MODELS OF THIS AIRPLANE
14. THIS TYPE RADIATOR USED ON LATE TYPE PRODUCTION AIRPLANES
CAMOUFLAGE PATTERN
WINGS, TAIL SURFACES AND FUSELAGE HAVE SAME CAMOUFLAGE PATTERN
RED
BROWN
BLUE
GREEN
CAMOUFLAGE PATTERN VARIED ALSO TO CONFORM TO LOCAL CONDITIONS
FUSELAGE DETAIL
AUXILIARY FUEL TANK FILLER NECK
STRUCTURAL RIB
4° ANGLE OF INCIDENCE AT CENTER SECTION
WIRE SCREEN M.G. STOP
M.G. RING
STREAMLINE STEEL TUBE CENTER SECTION STRUTS
13. THE ENGINE OPERATION WAS CONTROLLED BY MECHANICAL CONTROLS AND PUSH-PULL TUBES TO THE PILOT'S COCKPIT. THE TUBES TO THE ENGINE NACELLES CONTAINED UNIVERSAL JOINTS AND EXTENDED OUT FROM THE FUSELAGE EXPOSED TO THE AIRSTREAM.
STEEL TUBE GUN RING
AFT M.G. MOUNT TRUNNION
15. FUSELAGE CROSS SECTION ALONG THE ENTIRE LENGTH IS RECTANGULAR. TRANVERSE BRACING IS BY MULTISTRAND STEEL CABLE.
VERTICAL STABILIZER FITTING
HORIZONTAL STABILIZER FITTING
RUDDER HINGE FITTING
WELDED STEEL TUBE TAILSKID WORKS AGAINST COMPRESSION SPRINGS
CIRCULAR WINDOW IN FLOOR OF FORWARD COCKPIT
WELDED RING GUSSET
REAR GUNNER TRAP DOOR
STEP
FABRIC LACING
DOUBLE FABRIC COVERING
LOWER CENTER SECTION WING IS BUILT INTEGRAL WITH FUSELAGE
WELDED STEEL TUBE FUSELAGE STRUCTURE, BRACED AT AFT PORTION WITH MULTISTRAND STEEL CABLE
LANDING ANGLE 9°
SINGLE FABRIC COVERING
FORWARD PORTION OF FUSELAGE IS BRACED WITH SOLID STEEL TIE RODS
TRUSS TYPE ENGINE MOUNT OF WELDED STEEL TUBING
16. PROTOTYPE AIRPLANE DID NOT HAVE PADDLE TYPE AILERONS.
HORIZONTAL STABILIZER
HINGE
WELDED STEEL TUBE STRUCTURE
FABRIC COVERED
SECTION OF HORIZONTAL STABILIZER AT FUSELAGE AND FIRST RIB
MULTI-STRAND STEEL CABLE BRACING FORE AND AFT STRUTS
NORMAL AIRFOIL RIBS E.B.3.
LANDING GEAR
BALL AND PIN FITTING
STREAMLINE STEEL TUBE
COMPRESSION SPRING SHOCK ABSORBER
STEEL YOKE
FITTING
AXLE
RUDDER
WELDED STEEL TUBE STRUCTURE
FABRIC COVERED
CORRUGATED ALUMINUM SHEET
HINGE
LOWER OUTER WING PANEL
CONTINUOUS STEEL TUBE AFT WING SPAR
PROTOTYPE WING TIP
PRODUCTION WING TIP
FABRIC COVERING ON WING
STIFFENER FLANGE
STEEL TUBE WING TIP
MAIN WING RIB
FORMER RIB ON UPPER WING SURFACE ONLY
CABLE ACTUATED AILERON BELL CRANK
MILLED WOODEN LEADING EDGE
4° LEADING EDGE SWEEPBACK
CHORD 7'-3" AT THIS RIB
BALL AND PIN STRUT FITTING
MULTI-STRAND STEEL CABLE
AILERON CABLES ENCLOSED IN STEEL TUBES
WOOD STRINGER
STEEL CABLE TRAILING EDGE
STEEL TUBE
CORRUGATED ALUMINUM ALUMINUM SHEET
BALL AND PIN STRUT FITTING
LOWER CENTER WING
FUSELAGE
FUSELAGE TIE ROD
FUSELAGE LONGERON
CORRUGATED ALUMINUM ALUMINUM SHEET
CORRUGATED ALUM. WALKWAY
CORRUGATED ALUM WALKWAY
MILLED WOODEN LEADING EDGE
UPPER OUTER WING PANEL
CONTINUOUS STEEL TUBE AFT WING SPAR
PROTOTYPE TIP
PRODUCTION TIP
HINGE
AILERON CONTROL HORN
WELDED STEEL TUBE AILERON STRUCTURE
STEEL CABLE TRAILING EDGE
STEEL TUBE ANTI-DRAG STRUT
PADDLE TYPE AERODYNAMIC AILERON BALANCE
STEEL TUBE FORWARD WING SPAR
FABRIC COVERING ON WING
MAIN WING RIB FORMER RIB ON UPPER WING SURFACE ONLY
STEEL TUBE WING SPARS ARE MADE TO A RECTANGULAR CROSS SECTION AT TIP
MILLED WOODEN LEADING EDGE
3° LEADING EDGE SWEEPBACK
STRUCTURAL RIB
UPPER CENTER WING
CONTINUOUS STEEL TUBE WING SPARS IN CENTER WING
PIN AND CLEVIS WING SPAR FITTING
STEEL TUBE CLIP
PLYWOOD
STEEL TUBE
STEEL CABLE TRAILING EDGE
AUX. FUEL TANK NO.2 LATERAL STRINGER
AUX. FUEL TANK NO.1
PLYWOOD
PIN AND CLEVIS WING SPAR FITTING
DRAWN BY WILLIS LNYE
SHEET NO.2


NO DIHEDRAL ON TOP WING
TOP WING HAS SAME ANGLE OF INCIDENCE AS LOWER WING AND IS WASHED AT WING TIPS
STREAMLINE STEEL TUBE
AIR VENT
UPPER WING CENTER SECTION WINDSHIELD
OUTER WING PANEL JOINT
BRASS TIP ON PROPELLER
BRASS RADIATOR
FORMER WING RIB
WATER FILLER
MULTI-STRAND LANDING WIRE
AILERON CONTROL CABLE
AERODYNAMIC BALANCE ON AILERON
MAIN WING RIB
60'-8"
56'-10"
ANGLE OF INCIDENCE
DIHEDRAL ANGLE 0.75°
MULTI-STRAND FLYING WIRE
STREAMLINE STEEL TUBE INTERPLANE STRUT
OUTER WING PANEL JOINT
ANGLE OF INCIDENCE 3°
ANGLE OF INCIDENCE 4°
CORRUGATED ALUMINUM COVERING
STREAMLINE STEEL TUBE
32X6 HIGH PRESSURE TIRE
STEEL SPRING SHOCK ABSORBER
HEAVY BOMB RACK
MEDIUM BOMB RACK
CENTER SECTION STRUTS SHOWN. OUTBOARD STRUTS OMITTED FOR CLARITY.
AILERON CONTROL HORN
ENGINE EXHAUST MANIFOLD
AILERON CONTROL CABLES
AFT M.G. MOUNT RING
DOUBLE FABRIC FUSELAGE COVERING (FORWARD)
FLAT DECK
FABRIC COVERED WELDED STEEL TUBE FRAME RUDDER AERODYNAMICALLY BALANCED
SCARFF TYPE M.G. RING
THRUST LINE
GOERTZ TYPE BOMB RANGE FINDER
PLYWOOD COVERING ON FUSELAGE NOSE
FAIRLEAD
STREAMLINE STEEL TUBE
8° LANDING ANGLE
FORWARD PART OF FUSELAGE IS COVERED WITH ALUMINUM SHEET
HIGH PRESSURE L.G. TIRE
HORIZONTAL STABILIZER ADJUSTING FITTING
STEP
RUDDER CABLE
ELEVATOR CONTROL CABLE
WELDED STEEL TUBE TAIL SKID
LANDING SHOCKS ABSORBED BY STEEL COMPRESSION SPRINGS.
AFT FUSELAGE FABRIC COVERING IS ATTACHED TO UNDERSIDE FUSELAGE STRUCTURE BY LACING. ENTIRE FABRIC COVERING IS REMOVABLE IN ONE PIECE FOR INSPECTION AND ACCESSIBILITY.
SCALE
FABRIC COVERED WELDED STEEL TUBE FRAME ELEVATOR
ELEVATOR CONTROL HORN
ELEVATOR HINGE
PADDLE TYPE AERODYNAMIC ELEVATOR BALANCE
SIGHT
CARTRIDGE DRUM
PARABELLUM TYPE AIRCOOLED AIRCRAFT MACHINE GUN
MULTI-STRAND STEEL BRACE CABLE
FABRIC COVERED WELDED STEEL FRAME ADJUSTABLE VERTICAL STABILIZER
HORIZONTAL STABILIZER AIRFOIL HAS LARGE CURVATURE ON TOP AND BOTTOM SURFACES
FORMER RIB
VERTICAL STABILIZER ADJUSTING FITTING
HORIZONTAL STABILIZER ADJUSTABLE FITTING (3 POSITIONS)
ARC OF FIRE OF AFT UPPER M.G. IS 180° IN HORIZONTAL TRAVERSE
ARC OF FIRE IS 90° IN VERTICAL PLANE
AFT MACHINE GUN IS MOUNTED ON ROLLERS TO MOVE ON THE STEEL TUBE TRACK. GUN CAN BE LOCKED IN ANY POSITION.
SINGLE FABRIC FUSELAGE COVERING
WELDED STEEL FUSELAGE STRUCTURE
AFT TRAP DOOR FOR FIRING M.G.
STEEL TUBE M.G. RING
DOUBLE FABRIC FUSELAGE COVERING FORWARD TO PILOT
ENGINE EXHAUST PIPE
ENGINE CRANKCASE COOLING AIR EXIT
SCALLOPED TRAILING EDGE
AILERON CONTROL HORN
AFT WING SPAR
FABRIC COVERED WOOD AND STEEL WING STRUCTURE
ENGINE MOUNT
AUXILIARY FUEL TANK
AFT GUNNER'S SEAT
25 LB. BOMB RACK
BOMB RACKS
CONTROL WHEEL
AILERON HINGE
PADDLE TYPE AERODYNAMIC AILERON BALANCE
FRONT SPAR
MAIN WING RIB
FALSE WING RIB (TOP SURFACE OF WING ONLY)
NEGATIVE STAGGER AT WING CENTER SECTION IS 4°
FORWARD PART OF FUSELAGE IS COVERED WITH ALUMINUM SHEET
ENGINE NO.1
ALUMINUM SHEET COVERING
GUNNER'S SEAT
MAIN FUEL TANKS 95 GALLONS EACH
BOMB RANGE FINDER
AUXILIARY FUEL TANK
UPPER WING SWEEPBACK 13.5°
LOWER WING SWEEPBACK 15.4°
FOUR BLADE PROPELLER (10 LAMINATIONS) (ENGINE NO. 1) 260 H.P. MERCEDES TYPE)

(7) ON PROTOTYPE AIRPLANE, ENGINE NACELLES WERE PARTIALLY COWLED. ON PRODUCTION AIRPLANES, ENGINE NACELLES WERE COMPLETELY COWLED. PANELS WERE REMOVABLE. G-5 NACELLE TYPE SHOWN IN FRONT VIEW. (NO SHUTTERS SHOWN- SEE SHEET NO.2)

(8) PROTOTYPE AIRPLANES WERE NOT CAMOUFLAGED. SEE OPPOSITE PAGE FOR CAMOUFLAGED PATTERN USED ON PRODUCTION AIRPLANES.

(9) THE AIRPLANE IS INTERNALLY WIRED FOR WIRELESS TELEGRAPHY. ENGINE-DRIVEN GENERATOR IS ATTACHED TO ENGINE NO. 2. ELECTRICAL HEATING IS ALSO PROVIDED.

(3) ON PROTOTYPE AIRPLANE FORWARD GUNNER'S COMPARTMENT WAS LOCATED IN PLANE OF PROPELLERS. ON PRODUCTION AIRPLANES, THE GUNNER'S POSITION WAS MOVED FORWARD TO ATTAIN IMPROVED LONGITUDINAL STABILITY.

(4) ON PROTOTYPE AIRPLANE, VERTICAL STABILIZER WAS BRACED BY MULTISTRAND CABLE IN PLACE OF STREAMLINE STEEL TUBES USED ON PRODUCTION AIRPLANES.

(5) ALL MEMBERS OF CREW CAN CHANGE POSITIONS IN FLIGHT. BETWEEN THE FORWARD COCKPIT AND THE FLIGHT COMPARTMENT ACCESS TO EITHER IS POSSIBLE BY MEANS OF A SLIDING PANEL. ACCESS TO AFT COCKPIT FROM FLIGHT COMPARTMENT IS BY MEANS OF A TUNNEL PASSAGEWAY AFT OF SEAT NEXT TO PILOT. THIS SEAT CAN BE FOLDED AND STOWED UNDER FLIGHT COMPARTMENT COAMINGS.

(18) ON OUTBOARD INTERPLANE STRUTS AND IN ENGINE NACELLE BRACE STRUTS SINGLE MULTI-STRAND STAGGER WIRES ARE USED.

(17) ALL BOMB RACKS WERE OF THE MANUAL RELEASE TYPE

(1) PILOT'S COCKPIT CONTAINS FOLLOWING INSTRUMENTS:
ALTIMETER
COMPASS
FUEL QUANTITY INDICATORS
ENGINE REVOLUTION INDICATORS (2)
AIR TEMPERATURE INDICATORS
WATER TEMPERATURE INDICATORS (2)
AIR PRESSURE GAUGES (2)

(2) ON SOME AIRPLANES OF THIS TYPE, THE PARABELLUM AIRCOOLED MACHINE GUN IS MOUNTED ON A CONVENTION SCARFF MOUNT. ON OTHER AIRPLANES, THE GUN IS MOUNTED ON A TRUNNION. MOVEMENT IS FACILITATED BY ROLLERS ON A CIRCULAR TRACK. THE GUN CAN BE LOCKED IN POSITION.

LEADING PARTICULARS

(1). WEIGHT EMPTY	5258 LBS.
(2). GROSS WEIGHT	7130 LBS.
(3). UPPER WING AREA	393 SQ. FT.
(4). LOWER WING AREA	335 SQ. FT.
(5). TOTAL WING AREA	730 SQ. FT.
(6). WING LOADING LBS. SQ. FT.	9.77
(7). AILERON AREA, EACH	18 SQ. FT.
(8). AILERON BALANCE AREA	1.8 SQ. FT. EACH
(9). HORIZONTAL STABILIZER AREA	34 SQ. FT.
(10). VERTICAL STABILIZER AREA	11.5 SQ. FT.
(11). RUDDER AREA	21.0 SQ. FT.
(12). RUDDER BALANCE AREA	2.8 SQ. FT.
(13). ELEVATOR BALANCE AREA	3.6 SQ. FT.
(14). HORIZONTAL BODY AREA	207 SQ. FT.
(15). VERTICAL BODY AREA	203 SQ. FT.
(16). POWER LOADING	13.7 LBS./H.P.
(17). AIRFOIL	MODIFIED GOETTINGEN

PERFORMANCE

(1) CLIMB 5,000 FT. IN 10.3 MINUTES.
(2) RATE OF CLIMB AT 5,000 FT. 390 F.P.M.
(3) CLIMB, 9,000 FT IN 23.4 MINUTES.
(4) RATE OF CLIMB AT 9,000 FT, 235 F.P.M.
(5) MAX. SPEED 91 M.P.H. TO 5000 FT.
(6) MAX. SPEED AT 9000 FT. IS 86 M.P.H.
(7) LANDING SPEED IS 74 M.P.H.
(8) LATERAL CONTROL IS SATISFACTORY
(9) LONGITUDINAL CONTROL IS BAD AT STALLING SPEED.
(10) AIRPLANE IS EXCESSIVELY NOSE HEAVY IN THE EMPTY CONDITION.
(11) AIRPLANE IS FLOWN WITH GUNNER OR EQUIVALENT BALLAST IN FRONT COCKPIT.

ARMAMENT

2 ... LIGHT CALIBER MACHINE GUNS (PARABELLUM)
3 ... RACKS FOR 25 POUND BOMBS (INTERNAL)
8 ... RACKS FOR 4" DIAMETER (EXTERNAL)
8 ... RACKS FOR BOMBS (MEDIUM SIZE)
500 ROUNDS MACHINE GUN AMMUNITION

A.E.G. TYPE G-105 (III)

MANUFACTURED BY ALLGEMEINE ELECTRIZISTATS GESCHAFT ORGANIZATION (GERMAN GENERAL ELECTRIC COMPANY)

POWERED BY TWO 260 H.P. MERCEDES UNSUPERCHARGED AIRPLANE ENGINES AS SUPPLIED TO GERMAN AIR FORCES FOR DAY OR NIGHT BOMBARDMENT 1917-18

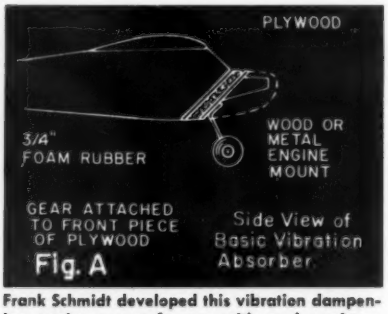
MARCH 18, 1934 SHEET NO. 1 (DRAWN BY WILLIS L. HYE)

Radio Control News

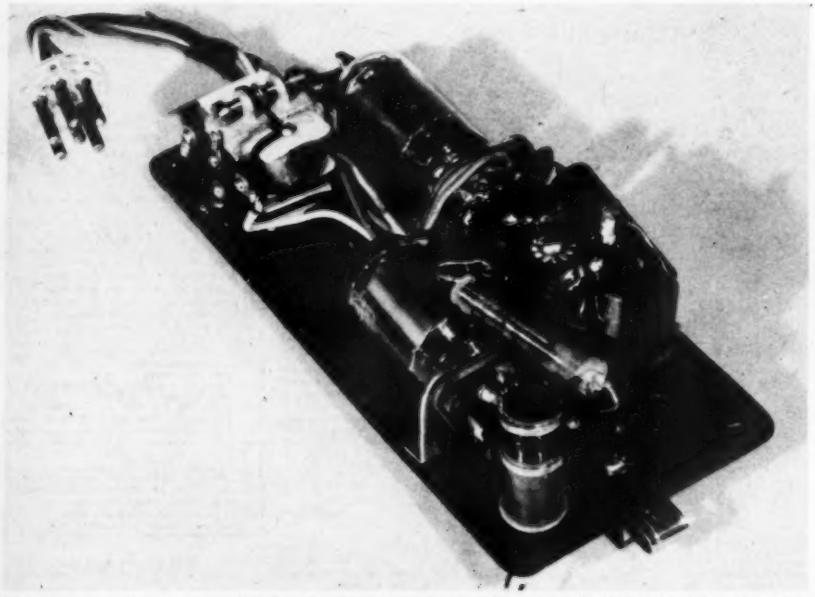
by E. J. LORENZ

Gil Miles, famed Australian RC expert, right, and son Geof, who is firing up a Windy Joe. Two motorized beep boxes plug into one transmitter for dual control. Miles has an interference-proof escapement.

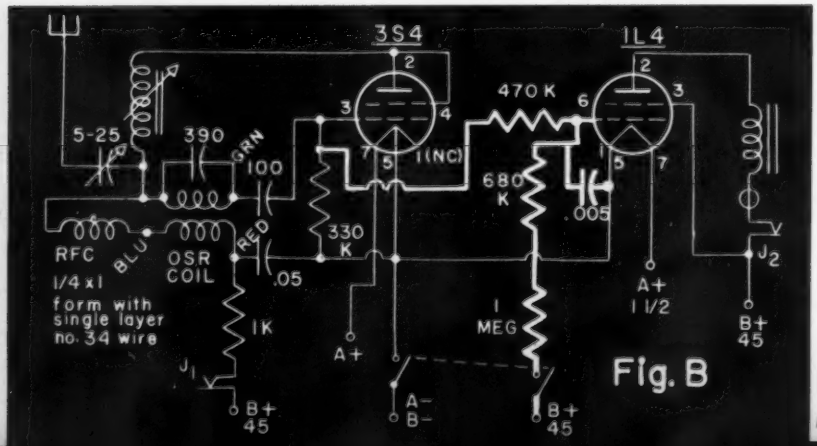
It's really a fine tuned round-up this time, what with those two challenging receivers, tech notes, club news, and new products.


PLYWOOD
3/4" FOAM RUBBER
WOOD OR METAL ENGINE MOUNT
GEAR ATTACHED TO FRONT PIECE OF PLYWOOD
Side View of Basic Vibration Absorber
Fig. A

Frank Schmidt developed this vibration dampening engine mount for use with reed receivers.

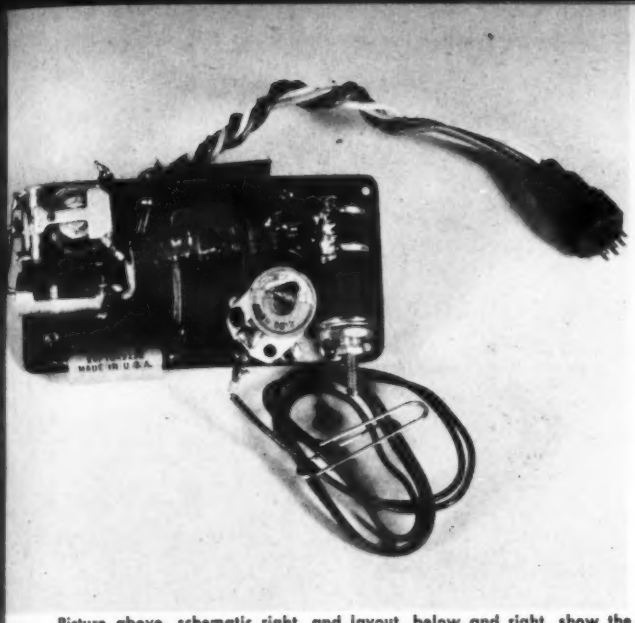


Picture above shows a very fine two-hard-tube receiver by George De La Mater, St. John, Mo.; the schematic below will enable the more experienced reader to duplicate it. Is different, quite sensitive.

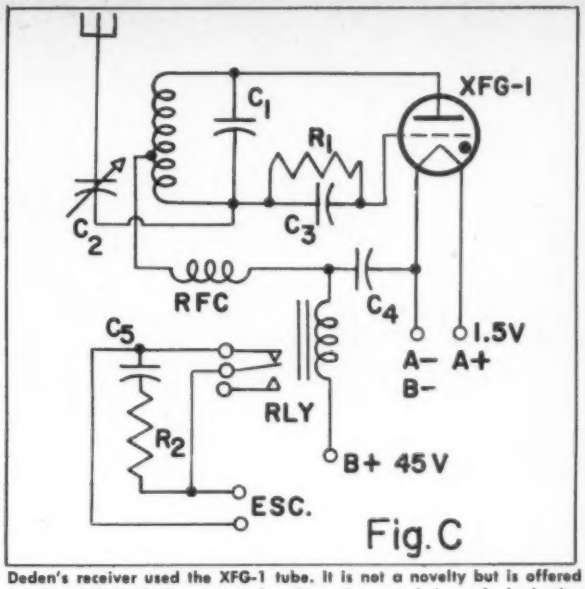


▸ In response to our articles on printed circuitry, we have a simple but useful application submitted by Mr. J. T. Deden, 1825 Levee St., Dallas, Tex. Fig. C shows the typical circuit for an XFG-1 receiver and Fig. D gives the pattern of the etched circuit, with components placed in dotted lines. It is suggested that you review the May and June, 1954, issues of MAN to become familiar with the making of printed circuits. This receiver is presented not so much as a novelty, but because it is an excellent beginning and offers a practical working unit of a printed circuit application. The pattern in Fig. D has been planned on conventional components obtainable at most radio supply houses and model RC suppliers.

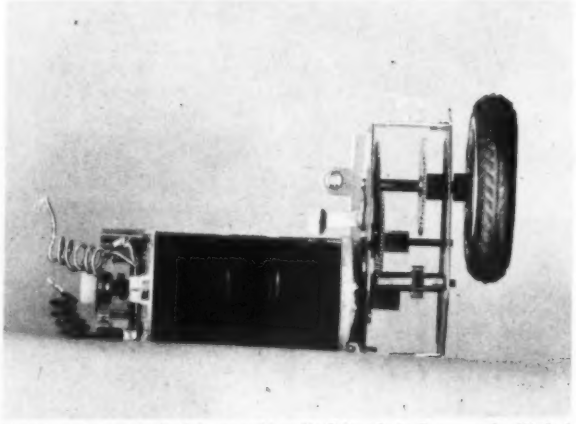
Begin by cutting a piece of 1/16 in. copper laminate (Control Research, Box 9, Hampton, Va., or Ace Radio Control, Higginsville, Mo.) to the size shown. Clean one side by sanding lightly with



Picture above, schematic right, and layout, below and right, show the printed circuit receiver as developed by J. T. Deden of Dallas, Texas.

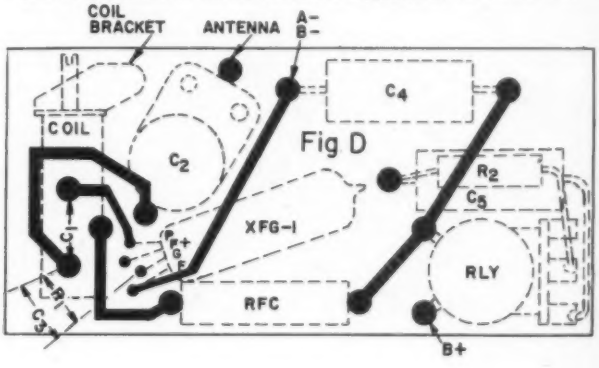


Deden's receiver used the XFG-1 tube. It is not a novelty but is offered as a good beginning point for those interested in etched circuits.



Electric motor, F. A. O. Schwartz, New York (made in Germany by Distler), has a current drain of 12-15 ma. (this is not a mistake!) on 4-1/2 volts.

Black lines on the Deden receiver drawing show etched portions of circuits; the placement of the components is suggested by the broken lines.



very fine paper or scrub with a paste of pumice and water. If your copper laminate has copper on both sides, one side may be peeled or etched off later, as desired. Paint the pattern on, as shown in Fig. D., using layout blue fluid, or use methods outlined in the May and June issues of MAN.

After the pattern has been applied, the plate is etched by placing it in a flat tray or in a half pint Mason jar and etching with a solution of 40° Baume Ferric Chloride, obtainable at most drug stores or lithography supply houses or shops. After all the excess copper is etched away, remove the resist paint with a suitable solvent, wash the plate in warm soapy water and then rinse well in running water. All component lands may be eyeleted for greater durability. Mount the components on the side of the board opposite the conductor pattern and use a small 25-35 watt iron when soldering. We're sure you'll have a good working receiver built in a novel way in about one or two evenings of work. We suggest a 10K pot in series with the relay in Fig. C, although it wasn't shown in our original drawing. The antenna should be about 24 in. long and tuning is done in the standard manner for this type of receiver. Check with someone who has a Boomerang or Aerotrol instruction manual.

Parts list for this receiver follows: C_1—4.7 mmf ceramic capacitor; C_2—4-40 mmf ceramic variable capacitor; C_3—100 mmf ceramic capacitor; C_4—.1 mf 150-200v paper cap.; C_5—.1 mf 150-200v paper cap.; R_1—3.9 meg 1/2W resistor; R_2—47 ohm 1/2W resistor; RFC—1/4 x 1 in. form wound full No. 30 enameled wire.

Coil—CTC form No. LS-3-3/8 in. O.D. with 19 turns; No. 30 enameled wire, tapped nine turns from plate end. Red dot slug. Relay—Neomatic 7250 ohm; Tube—XFG-1; Socket—Sub-miniature hearing aid five pin, or flea clips; Base—1/16 in. copper clad laminate with 1 oz. copper (.0014 copper); Hook-up wire and plug and socket if desired.

Fig. B is not just another "two-tuber" receiver. This novel design by Mr. George De La Mater, of 8618 Belcrest Lane, St. John, Mo., is a hard tube unit featuring long life operation and is novel in that the bias signal for the second tube is obtained *not* from the plate circuit of the first tube, but from the grid circuit. This will not be a construction article but we'll give you the necessary information to build this receiver and tune it.

The first stage, employing a 3S4 tube, is of the standard type circuit using a quench coil. As in any super-regenerative circuit, a negative voltage is developed across the grid resistor when the circuit is not receiving a signal. Upon receipt of a sig- (*Continued on page 37*)

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P. G. F. CHINN

FOREIGN NOTES

With many developments in design, materials, methods taking place throughout the world, the well informed modeler must be internationally minded.

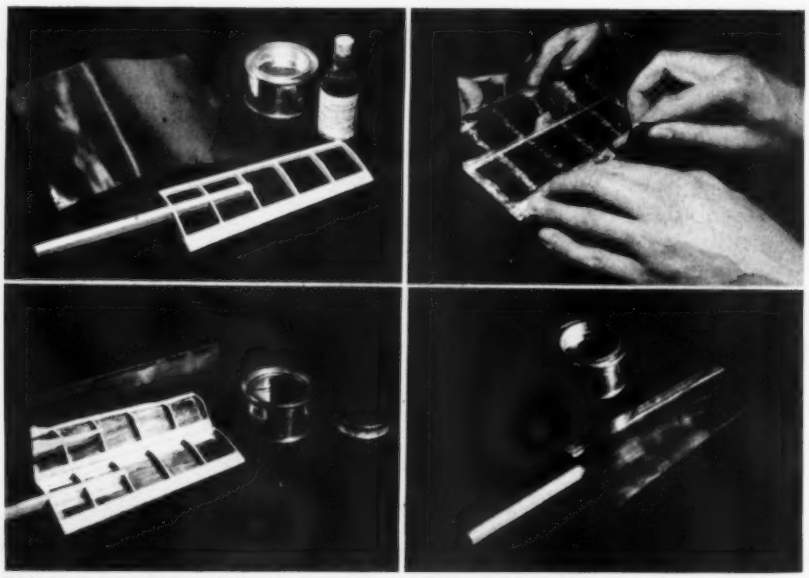
by P. G. F. CHINN

The Phenomenal Oliver Engines

▶ In these days of good, quantity-produced model motors, there is seldom any market for the hand-built engine made in small numbers, unless it has something special to offer. One such motor is the British-made Oliver, for the Oliver Tiger engines, built in two sizes, stand head and shoulders above anything of similar displacement made anywhere, for sheer power.

Developed through a long line of 2.5 cc and 1.5 cc model racing car engines (in which field they were outstandingly successful), two new Oliver models for model aircraft use will be available by the time these words appear. We have just obtained the first two engines produced for test and preview in MAN.

These are the Tiger 2.5 Mk.3 (.15 cu. in.) and Tiger 1.5 (.09 cu. in.) Diesels. Let us say, right away, that each

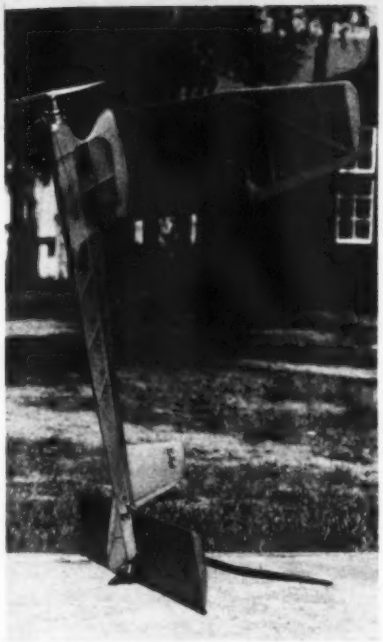


Klebmetall, new German light metal covering. Top, right, metal is etched with sandpaper to form keying surface for cement. Note high surface polish. Bottle contains thinner for the special cement.

of these motors costs nearly twice as much as any equivalent displacement volume-production engine. In return for such dough, you get a superbly engineered and beautifully finished engine, the horsepower output of which is 25-30 per cent greater than the average and at least 10 per cent better than its nearest competitor. For the serious contest man, the Oliver is likely to become a "must" in Europe. For FAI International-class free flight, for example, the .15 Tiger Mk.3 should be capable of adding a clear half-minute to flight duration.

It was, however, in Class A team racing (up to .15 cu. in.) that the Oliver Tiger claimed most attention last year. The engine's amazing fuel economy combined with outstanding speed figured in many important wins. Flying on regulation 42 ft. lines, these models were covering three miles per 1/2 oz. tank of fuel at speeds sometimes exceeding 80 mph.

The design of the Oliver Tiger engines features the use of a two ball bearing mounted crankshaft, circumferential porting with a medium-stroke-bore ratio and a shaft type rotary valve. Cylinder assembly, consisting of liner and separate finned alloy barrel, is held down by four through-bolts passing into the crankcase. Both engines, although heavier than most units of equal displacement, are very strongly made. Col-



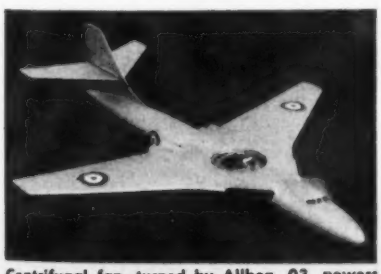
Vertical Take-Off (VTO) jobs catch on in Europe. This is Gorham's British FAI team contender.

let type prop drivers fitted on split tapered sleeves are used.

Oliver engines are made by J. A. Oliver, 136 Radford Rd., Nottingham, England.

VTO Catches on in Europe

Following the successful use of vertical-take-off by a small section of the entry at the World Power Championships last year, increasing numbers of European free flight enthusiasts are turning to this system. Actually, VTO is not completely new to Europe—we saw a vertical-take-off model in Italy way back in 1946—but, until last year, the system had not attracted much attention. This was probably attributable, in part, to the fact that a lot of European FF models were relatively low powered and would not have taken off vertically satisfactorily anyway. Fliers are now finding that, with a high powered model, VTO is far less risky than normal ROG. This is largely because the high powered modern free flight, when trimmed out for a fast climb, flies at a low angle of attack and, when first released for a normal ROG, hugs the ground while building up (*Continued on page 40*)



Centrifugal fan, turned by Allbon .03, powers four-jet Valiant scale bomber. John Coatsworth.

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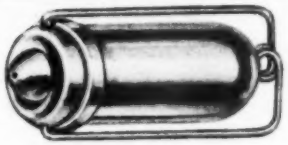

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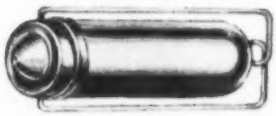

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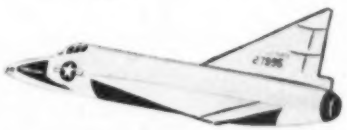

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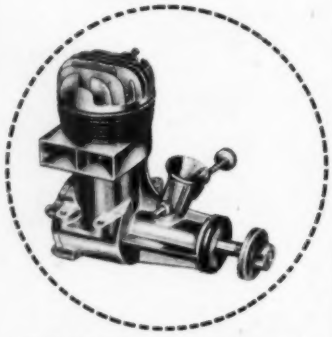

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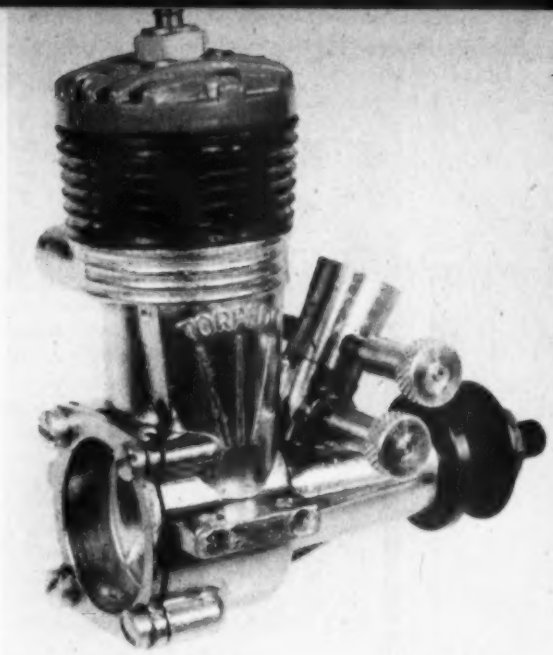

ENGINE REVIEW

by E. C. MARTIN

K & B's Two-speed .15 engine gives a flexible output as required for varying design needs.

▶ With the spreading popularity of the .15 International displacement class, particularly among radio fans, the new two-speed K & B .15 will be specially welcomed, and because of its outstanding performance and success in "straight" form, it is also interesting to see what comes out of the "detuned" version.

Bearing in mind that, although the standard engine produces about 112 bhp/litre, and is therefore an all out racing type, the recently published test showed that a 9 x 6 prop could be stirred at 9,500 revs, which indicates unusually good torque for the displacement, and particularly for a "top end" engine, and so the .15 therefore promises a high potential for brute force applications. The modifications incorporated in the two-speed type accordingly are directed toward improving this potential and making it more flexible around the relevent rpm range.

Apart from having the usual pair of needle valve units, which, all other things being equal, will slightly reduce breathing efficiency at high speeds, considerably smaller diameter and longer intake are employed to increase induction air velocity at all speeds, and, therefore, fuel suction, but also inevitably cuts down maximum rpm and bhp.

However, a series of figures obtained on loads identical with those used on the standard test engine revealed that up to about 12,000 rpm, performance is substantially the same for both, while at the lightest tested load, using a 7 x 4 Power Prop, the standard unit reached 14,300 rpm, and the two-speed type just fell short of 14,000.

From this it appears that at all speeds useful to the normal type of model requiring motor control, there is virtually no difference in power output between the two engines. With regard to maximum rpm we found that the two-speed was reluctant to run evenly on any sort of prop beyond about 15,000 rpm, whereas the standard engine would easily run over the maximum tachometer calibration of 20,000, which, if nothing else, makes exquisite music.

The significant and most important advantages of the two-speed for its particular applications naturally appear at the other end of the rev scale. With greater suction from the smaller bore intake, starting is strictly a choking operation and no exhaust prime is necessary at any time. It is, in fact, much easier to muff a start by flooding than by starving, which is no doubt also attributable to the excellent piston/cylinder fit and compression seal. A slightly "leaky" engine, on the other hand, often prefers a sloshy condition for starting.

Needle control response is much more pronounced at low speeds than with the standard version and, while precise and progressive, is quite critical compared with most other engines.

The lowest speed on the rich running jet from which a clean pick-up could be consistently obtained, using an 8 x 6 Power Prop, was about 4,000 rpm, and at this speed the exhaust was reasonably dry and the plug still visibly glowing and, it might be added, the 8 x 6 prop was still producing a prodigious amount of thrust.

Since writing the original .15 test report, we have enjoyed many hours of operation with these engines and, apart from complete freedom from trouble of any sort, the (*Continued on page* 51)

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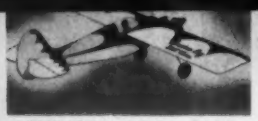

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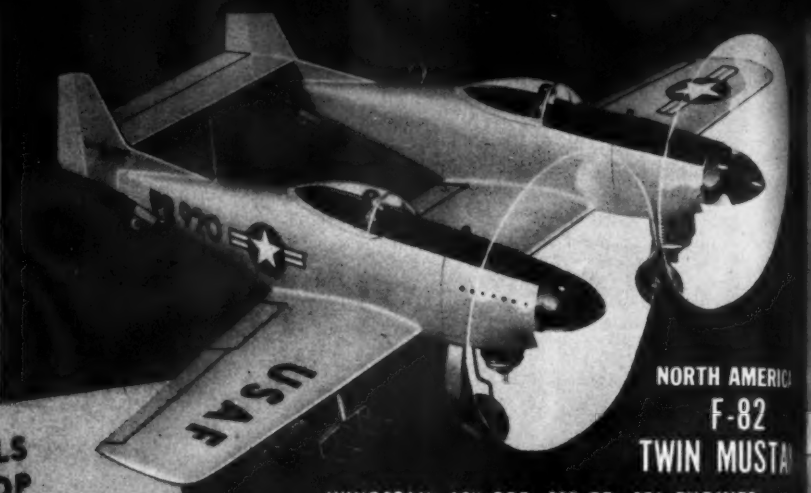

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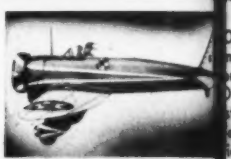

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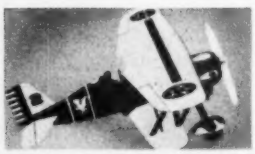

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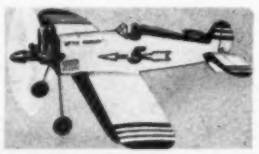

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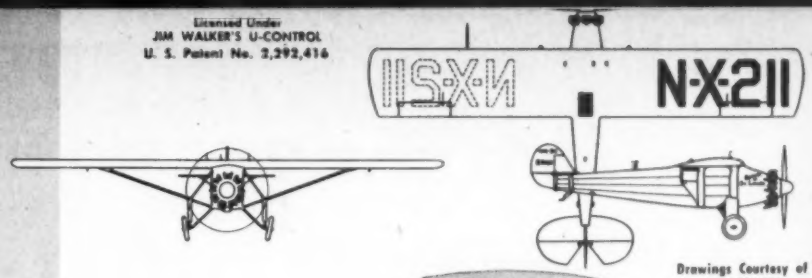

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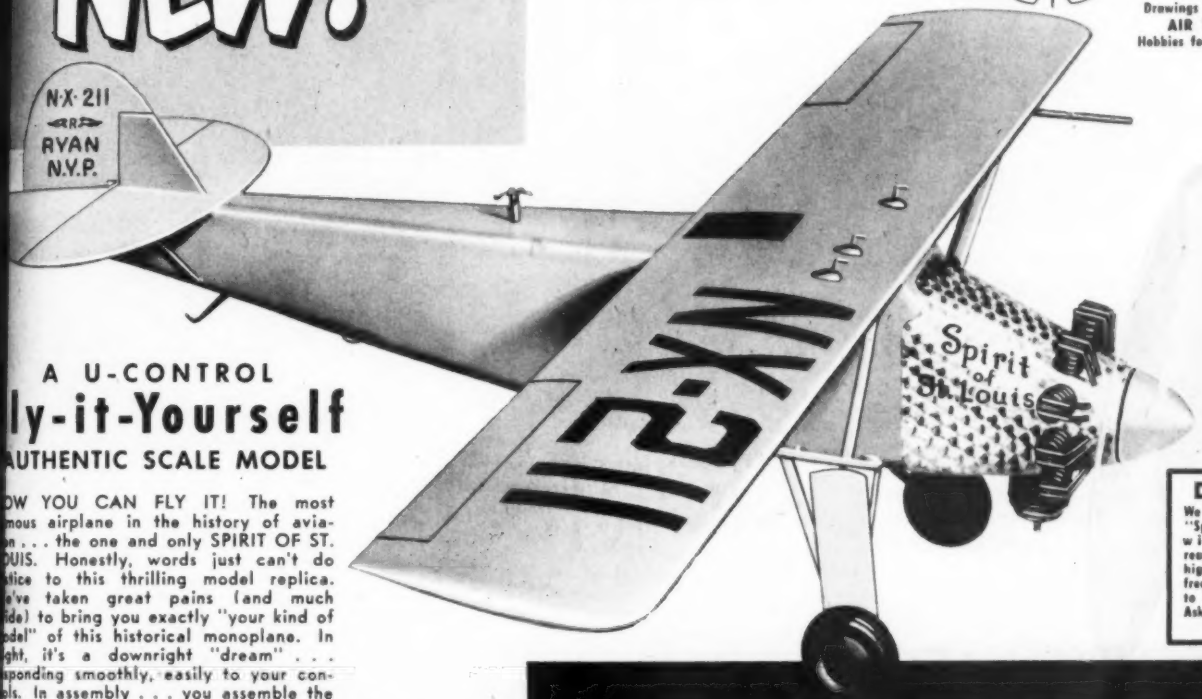

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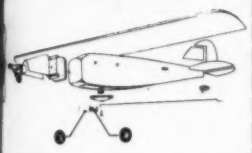

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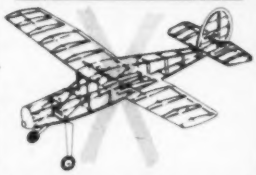

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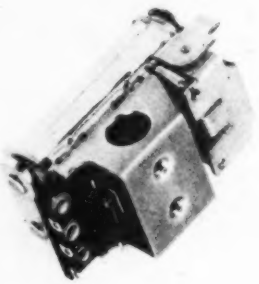
As compared to the 4F, the 26F is slightly smaller, ¼ ounce lighter and is more resistant to vibration and shock. Its major hope is the lower operating current and differential which means longer battery and tube life. Cost is slightly more than the 4F.



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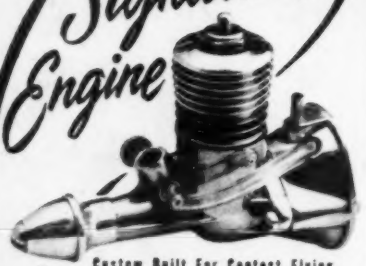

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CRAFT, MODEL & HOBBY INDUSTRY

30 E. 29th St. New York 16

Modeling's Toughest Event

(*Continued from page* 11)

I omitted the dead weight in the outboard tip usually placed on all controlline models and in its place warped the trailing edge of the inboard wing in a down position. This was only done to help save weight.

Flying this plane turned out to be quite an experience and one I won't forget for a long while. On its initial flight, it was released from a standing position with the "cargo" and about a half pint of fuel.

The plane just about crept along for the first couple of yards with the engine turning over at full speed on a 10-5 prop. By the time it reached the half lap mark, it was traveling at a fast walk. However, at the three-quarter point, which was into the wind, the plane left the ground with ease. It took about eight laps to accelerate to its normal flying speed, which is between 35 to 40 mph.

After making a number of test flights, I found the best way to run 1-3/4 pints through the engine without stopping was to set the needle valve in a very rich position at the beginning of the run. This in turn made take-offs hard and sometimes impossible and in addition wasted a lot of valuable fuel. I therefore worked out a simple motor control device to keep the engine in a lean running condition throughout the flight and eliminated the above troubles. This device was set so that full down control would open the needle valve one-quarter turn. This cycle could be repeated about 20 times, permitting the needle valve to open five full turns. I worked out this device around an old Aerotrol escapement. It was the type that revolved one-quarter turn when a signal was received and another one-quarter turn when the signal was stopped, or a total of one full turn of the shaft on two signals.

I removed from the stock escapement unit the coil assembly and leads, leaving only the frame with the L-shaped pawl and the shaft still attached to the flat brass segment with the notched ends. I soldered on the shaft to the rear of the frame, a round section of brass 1/4 in. long and 3/16 in. in diameter. This was to be used as a pulley around which a heavy thread would wind as the escapement was made to rotate. This assembly was then mounted in the plane between the front firewall and the landing gear former, with the pulley running parallel to the needle valve assembly and located directly behind the adjustment side of the needle valve assembly.

The needle valve stem was then modified to include a pulley 3/8 in. in diameter and 1/2 in. long. Four lengths of 1/8 in. flat rubber were strung from the escapement hook to the oposite side of the fuselage, a distance of about 2 in., and attached to a winding hook that projected through the fuselage side. A simple linkage was then hooked up extending from the bellcrank through the weight compartment and into the engine control compartment to the L-shaped pawl. The system was adjusted so that a full down control at the bellcrank would cause the linkage to move the L-shaped pawl enough to permit the escapement to revolve one-quarter turn.

When the bellcrank was returned toward neutral, the spring in the escapement would force the pawl back to its original position, allowing the escapement to make another one-quarter turn. After this mechanism was operating freely, about eight to ten turns of heavy thread were wrapped around the pulley on the needle valve assembly. The other end of this thread was fastened to the pulley on the escapement. Now a full down control position of the bellcrank would cause the thread to wind up on the escapement pulley and in turn unwind from the needle valve, causing it to turn to the open direction.

With this control it was always possible to take off with a lean engine and permit it to run until it was slightly over-lean before working the control. A Jim Walker Pressure Regulator could easily be substituted for this device, with the pressure being supplied through a tap in the crankcase of the engine, near a point opposite the intake venturi on the shaft. A number of articles have already been written on tapping the crankcase for pressure so I w.l. not go into the details at this time.

After designing, building and testing the winning plane in a one-month period and attaining a flight of one hour and thirty-two minutes, I feel that this time can be greatly increased through additional experimenting and testing. For example, I never had enough time to work out a fuel blend which would give the best flying time, or to try out larger propellers to slow down the engine and still obtain enough power to get off the ground.

I think that is enough chatter to give you an idea of what the event covers and a few tips on how to get started on your own design. Pan American, in this event as well as in all their PAA Load Events, take good care of the winners in addition to giving all contestants a good time, so—let's get with it and get a head start on this new up and coming event! END

Radio Control News

(*Continued from page 27*)

nal this negative voltage decreases. For example, the negative voltage may be −20 to −25 V with no signal and −10 V with a received signal. The principal circuit, comprised of the 470K, 680K resistor and the 1 megohm pot, is outlined in heavy lines. The resistors are in series, with one end at the negative voltage of the grid resistor, which is about −20 to −25 V, and the other end at the +45 V of the B battery. Varying the 1 meg pot will vary the voltage at the grid of the second stage from about −10 V to +6 V, which is plenty of latitude to produce cut-off of the 1L4.

The detector tank circuit consists of 17 turns of No. 28 enameled wire on a 3/8 in. CTC slug tuned form. Following is the accepted tuning procedure for this receiver: the 1L4 is removed from its socket. The first stage, or detector, is tuned in the normal manner by observing the dip in plate current upon receipt of an incoming signal. This is done by inserting a 0-3 or a 0-5 ma DC meter in jack J_1. Place the 1L4 in its socket. Adjust the 5-25 antenna capacitor until the first stage reads maximum, about 2 ma, when no signal is being received, but is (first stage plate current) on the verge of dropping if the capacitance is slightly reduced. Place a meter in J_2 and adjust the 1 meg pot until the meter just reads 0. Upon keying a transmitter, the relay current will jump from 0 to 2 ma, depending on the relay resistance. A relay with a resistance of 5,000 to 8,000 ohms is recommended. Here are a few notes in general on this receiver.

The second stage tube should be of the sharp cut-off type. A VTVM (vacuum tube volt meter) must be used to measure the change in bias voltage across the 330K grid resistor in the first stage. A rheostat could be placed in the plate circuit of the second stage, between the relay and the jack as indicated, if control of the relay current is desired. The escapement or actuator is connected across the *normally open* points of the relay, since this set works on positive relay action. The average total current drawn by the B supply is 2 ma. The first stage idles at 2 ma and drops to about .8 to .5 ma while the second stage idles at 0 and rises to 2 ma with signal. This receiver was checked out at a ground distance of one and one-quarter miles, using a transmitter with an *input of only* 3 *watts* and perfect response resulted.

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Deluxe 66-pc. scale marine fitting set for Kit B-7M	B-7F	4.95
Century Sea Maid '20'	B-8M	7.95
Deluxe 35-pc. scale marine fitting set for Kit B-8M	B-8F	3.95
Higgins 26' Express Cruiser	B-9	3.95
Harco '40' Deluxe Cabin Cruiser	B-10M	10.95
Deluxe 64-pc. scale marine fitting set for Kit B-10M	B-10F	4.50
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discussion of two receivers. We are presenting this information as received from our readers and if you have any questions regarding the particular subject, write directly to the originator of the idea. We believe all of these have merit and provide much food for thought, even though you may not have an application for the idea at the present time.

Frank Schmidt of Erie, Pa., manufacturer of Channel Master control equipment, has been doing a bit of research on vibration elimination and offers this advice. Logically, the first place to start is at the suspected source of the vibration. In our case, the engine or prop (or both) may be the offender and Fig. A shows the latest proposal to eliminate or minimize the vibrations emanating from this source. Basically, we have a piece of 3/4 in. thick foam rubber, cemented between two pieces of plywood, the thickness of the wood being determined by the size of the engine and the plane. This "sandwich" comprises the firewall and is set at an angle approximating that shown in Fig. A. The firmness of the foam rubber, as well as the correct angle for your particular installation, will have to be determined experimentally, for the mounting of the "sandwich." Downthrust and gyroscopic effects will also have to be taken into consideration.

This "sandwich" also provides shock mounting for the landing gear and cushions the engine. Depending upon the design of the plane, you could attach the main gear or the nose wheel of a tricycle gear to this unit. Frank has *completely* eliminated vibration on the main fuselage frame by using a piece of 3/4 in. thick foam rubber 3 in. wide by 6 in. long. A Fox .19 engine with an 11-4 prop was used in the test work. Needless to say, the correct grade of rubber must be used, otherwise vibration may be increased. Properly constructed, engine rpm can be increased 10 per cent. For further information write to Frank Schmidt, 350 East 33rd St., Erie, Pa.

Club News

The Milwaukee Flying Electrons are still pushing RC work for all it's worth. Their latest contest, as we write this, drew an entry list of 88 fliers and over 5,000 spectators.

From A. E. Abrams of 1031 Pond St., Bristol, Pa., we get notice via "Flypaper" of the great interest in RC boats by the regular FF and RC boys. Next month we'll have the results of the RC boat and RC seaplane contests held there on August 1. The boat pattern and rules are practically identical with those in the March '54 issue of MAN. Please let us know if you are interested in RC boats.

While this is not directly associated with American radio control work, we thought you'd be interested to know our British RC fliers will be paying about $3 for a five year license, to use 27 mc and 465 mc. This fee is to defray cost of issuing licenses and other paperwork.

What are *you* doing about an RC duration record? After Walt Good got the record back in this country with a 40 minute flight, a flier from the land of the Volga claimed 71 minutes. Then from "down under," Les Wright set a New Zealand RC duration record of 1 hour 25 minutes. Not to be outdone in this field, Mr. G. Pike of Nottingham, England, flirted with a stiff neck for 1 hour 32 minutes and 49 seconds.

Quite a few individuals and clubs have written in asking what tools and electrical equipment to get for RC work. This can best be broken down into two classes, which could be used by either the individual or the club. The first group is basic and should be the minimum for most building:

1 small Ungar soldering iron; 1 pair long nose pliers; 1 pair diagonal pliers (cutting); 1 small roll Ersin 60/40 solder, 18 ga.; 1 hand drill, and drills as needed; 1 small vise; 1 center punch and small hammer; 1 multimeter (Electronic Specialties, 58 Walker St., New York City; Control Research, Box 9, Hampton, Va., Citizen-Ship Radio Corp., P.O. Box 5971, Indianapolis, Ind.; Gyro Electronics, 325 Canal St., New York City; also: 1 jeweler's saw and assorted fine blades; 1 6 in. or 12 in. steel scale.

For the advanced builder or a club group, we suggest basic power driven tools such as a drill press, jig saw and a small shear and brake for professional looking metal working. Socket punches, to fit almost any size socket, are available at most radio supply houses. A trip through your local hardware

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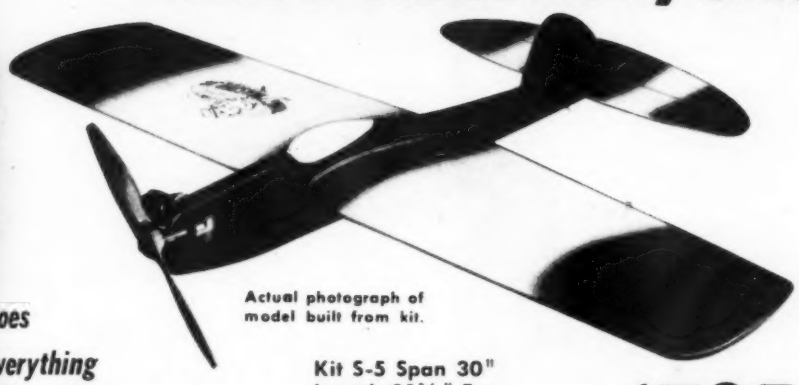

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store will acquaint you with a variety of small tools to fit your particular needs. In the electrical line a vacuum tube voltmeter is a must for advanced builders. A grid dip meter will prove invaluable in RF design work and an oscilliscope will cut hours from tinkering around with unknowns in a circuit. Individual milliammeters and voltmeters always come in handy when testing or checking a new design. Audio work may require the use of an AC voltmeter and a capacitor bridge will enable you to check the capacity of any unknown capacitor generally used. Where do you get all of these instruments? The best source on the market, for RC work, in our opinion, is the Heath Co. of Benton Harbor, Mich. A multitude of instruments in kit form are available in Heath's latest catalogue and at a price that clubs and advanced builders can afford.

New Items

Many simple beep boxes have been tested and actually used by us for flying. The new Rotary Beep Box, by Gyro Electronics Co. of 325 Canal St., New York City, is excellent. Measuring 2-1/4 in. square and 1 in. thick, it may be used with any transmitter in connection with a self-neutralizing escapement. Smooth in operation and well constructed, it sells for $1.95.

Jerry Pullen of Radio Control Specialties, Eugene, Ore., producer of reed relay units, announces production plans for a complete reed receiver and transmitter. In the meantime, complete plans for a reed receiver and transmitter may be purchased for $3 from this company. Either the three or five-reed unit is driven by three subminiature tubes. Radio Control Specialties is the latest manufacturer in the field of multi-channel equipment.

Hollywood calls it colossal, gigantic or stupendous when a smash movie is made. On our next item we'll stick to the one word that describes it best — amazing. It is an electric motor from a toy car (Distler) made in Germany and sold by the F. A. O. Schwartz store on Fifth Avenue, New York City. This motor produces useful power with a current consumption of but 12-15 ma with 4-1/2 V applied. Compare this with the 300-600 mils drawn by the regular small electric motor. When running with no load applied, the current drain is but 8 mils. Needless to say, this motor opens possibilities formerly possible only when using bulky, heavy, power-consuming circuits. Cost of the car, complete with battery, was only $5. The motor measures 1 in. in diameter and is 2-1/4 in. long, weighs but 2-3/8 oz., and operates not so much on a new principle as on an extremely efficient physical and mechanical design. This motor has the permanent magnet field *inside* the armature and is reminiscent of the old French rotary Gnome engine of World War I, in which the crankshaft remained stationary and the bank of cylinders revolved.

We believe the high efficiency of this double-ended ball bearing motor with composition brushes is obtained by the unusually long armature, which gives the windings more effect in cutting the flux of the PM field. As with any small motor of this type, the current increases as the applied load increases. However, the fully stalled current, when using 4-1/2 V, is but 150 ma.

A new subminiature sensitive relay, offering small size, light weight and high shock resistance, designed expressly for radio control application, is available from American Telasco, Ltd., Huntington, N. Y., U. S. distributor for ECC (Telecommander) Ltd. of England.

The specifications of the P-100 relay are: weight, 1 oz.; dimensions, 1-3/16 x 7/8 x 11/16 in.; resistance, 3,500 ohms; sensitivity, 20 milliwatts. The relay is of the polarized type and has a balanced movement which is unaffected by mounting position or movement of the relay. Single pole, single throw change-over contacts are employed, and contacts are made of solid silver. Adjustments to the contacts are not normally required, but may be made by two screws.

A protective plastic case provides high shock resistance and convenient handling. The unit is equipped with a six-pin plug which fits a laminated socket supplied with the relay. Polarity may be reversed simply by reversing the relay in its socket. Pins and socket are both heavily silver plated. Price is $7.95. Further information may be obtained from American Telasco, Ltd., Huntington, N. Y.

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Foreign Notes

(*Continued from page 31*)

speed for the climb. Under gusty conditions this can prove dangerous. The VTO job, on the other hand, gets away from such conditions quickly and is pointing in the right direction from the start.

German Metal Covering

With so many of today's military and commercial aircraft finished in natural metal color, the task of the true scale model enthusiast who aims at obtaining utmost realism, is made increasingly difficult, for no painted or doped surface can accurately simulate a natural metal finish. Various attempts at obtaining the authentic appearance have been made, mostly using aluminum foil, but by far the best we have yet seen (discounting all-metal riveted structures which are somewhat beyond the scope of the average model builder) is a new German product called Klebmetall.

Klebmetall is a thin aluminum alloy and comes in highly polished rolled sheets 27-1/2 x 19-3/4 in. It is easily stuck to any wood frame by a special cellulose base cement supplied and it can be cut with ordinary household scissors. It weighs .88 oz. per sq. ft. Thus, the covering, for example, of a team racer wing, should account for only about 1-1/2 oz. weight. Our photographs show the sequence of operations in covering a balsa framework with the metal. Cement used is a slow-drying type and structures take about 12 hours to harden completely.

Klebmetall is put out by Constructor-Verlag, 6/8 Westernstrasse, Paderborn, Germany.

Japanese Contest Classes Finalized

Following investigation of FAI, AMA and various national contest rules of western countries, Japan has now adopted a system of classes aimed at combining many advantages of each which, at the same time, will fit in with particular trends and requirements in Japan. Free flight classes are Half-A, A, B and C, of 1 cc, 2.5 cc, 5 cc and 10 cc respectively. For contests (as apart from records) B and C will generally be combined. Model specs are based on AMA rules. CL speed is in line with FAI rules, the only difference being the 25G pull test for Class A. Stunt is also divided into these three displacement classes. For towline glider a 50 meter towline length has been adopted. Both rubber and glider are unrestricted, except in International class where Wakefield and Nordic A.2 are adopted respectively. All free flight calls for three five-minute flights.

Two New German .15's

The latest additions to the ever increasingly popular 2.5 cc (.15 cu. in.) class in Europe are two new German motors: the Jaguar made in Munich, and the Taifun Rasant made in Kirchheim-Teck. Both are plain bearing, shaft valve Diesels in which considerable emphasis has been placed on weight reduction (both engines being around the 3-1/2 oz. mark) and low price. The Taifun model is a beam mount unit and follows the same general layout as the existing Taifun range. (See *Boom in German Engines,* MAN, 4/54.) An output of .23 bhp at 12,000 rpm is claimed. The Jaguar uses a combined beam-radial mount crankcase similar to that of the OK Cubs and employs the popular continental 15 x 14 mm cylinder size. Claimed output is .24 bhp.

Elmer Prop Improved

The Elmer automatic variable-pitch, constant-speed prop which we described in June has now been improved and incorporates a detachable blade mechanism. Spinner and bobweights are polished and appearance is further improved by the adoption of black acetate plastic for the blades.

News from Malaya

"East is East and West is West . . ." etc.,

(*Continued on page* 42)

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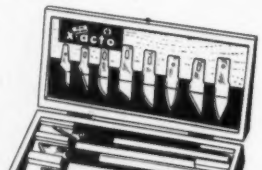

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etc., but V. W. Symes reports from Kuala-Lumpur (Malaya) that their model club, which has been in operation for five years, has European, Chinese and Indian members who get together on Sundays and fly many types of models, both free flight and control-line. Just another example of how model building recognizes no racial barriers.

British Centrifugal Fans

John Coatsworth, who pioneered the centrifugal fan model in Britain, has produced many interesting and successful scale models using this form of ducted fan propulsion. His latest is a model of the Vickers Valiant four-jet bomber. Dart .03 Diesel placed vertically in fuselage drives the "vacuum cleaner" rotor and air is ducted to scale outlets in wings. Model spans 24-1/2 in.

END

MAN at Work

(*Continued from page 6*)

prop. Having already found out that when a kid teaches himself to fly and stunt, engine operation is a weak spot, we now can add ignorance of props. Kit manufacturers should tell more about the significance of diameter and pitch. Post mortem led to the fact that the pilot cut a ten down to a nine but that second figure in the hub didn't ring a bell: 'twas three and a half. Have often noted that when a stunt job augurs in, the trailing edge usually fails under tension at the center, almost certainly when there is a joint as on a tapered wing, then the spar may also fail under tension at the end of joiners and, as the wing halves fold forward, the spars rip out the ribs. Most of these failures can be prevented by running music wire over the trailing edge, or along its extreme edge, for quite a few inches out on each panel, then sticking bent-over ends into the wood.

Then the leading edge section should be beefed up because it may go under compression. Take care of that and the wing acts like a wedge to split the fuselage. Ply doublers stop that. And while we are at it, when is someone going to realize that for untutored kids—we all can't be experts—the typical stunt wing is a real tough thing to make. Profile fuselage and outline cut tails are a cinch but 75 per cent of 15-year-old kids will foul up a stunt wing. It's time for some imagination and evolution in stunt wing structures. How about those D-leading edge deals, for example? When the back of the so-called D is open, a vertical web of thin sheet balsa can be added, cementing to the rear of top and bottom spar, between the ribs. The weight increase is negligible, the strength increase enormous. The same goes for RC wings.

* * *

▸ Joe Wagner, one of the creators of the Dakota—one of history's most fascinating kits, in our book—has joined Kenhi. Joe and Ken Johnson of Kenhi are old collaborators. What's cooking, boys? . . . Grover Moore, whose police dog Von locates his master's specially scented (for dogs) airplanes: transplanted his fascinating scale activities to Cottage Grove, Ore. Reports that Cottage Grove fliers want you guys to know they are plenty active. Grover goes Chuck Wood (Seattle) one better on flying scale rules with which he too disagrees violently. Believes that some factor should equalize things between the traditional Cubs (anybody can do them!) and, say, a Mustang. Reminds us of the old hassles over single and multi-engined jobs in ukie scale . . . Wish we could tell you the details of all the Wakefield eliminations but it just isn't in the cards. Pop Robbers sent a swell report, five pages, mostly single spaced, which gives you the idea. Noted that Dick Baxter ran up 892.1 seconds on his five flights to place on team. But the meet was noteworthy for the world-shaking aerial collision (that's no exaggeration) between Joe Foster

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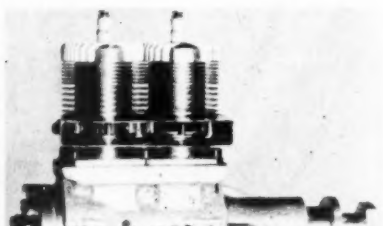

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ME-109 Messerschmitt	2.75	P-47 Thunderbolt	2.95

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and Joe Bilgri's ships. Put both men out of the running. There's a coincidence. The two Joes have been the U.S.'s big guns for several years and they eliminate each other. Must be an easier way to pick a team.

Joe Bilgri tells us that Clark Hahn took first in the Nordic elimination at Stockton, Calif., with 567 seconds on five flights and has shipped his glider to the Championships—held today, as this is being written—in Denmark. Last year the U.S.'s sole entry, "perfesser," my-story-was-in-Life, Perryman, had his towline snagged by another flier (no wind, so they towed in all directions and, with the Babel-like confusion of many tongues, you can imagine the outcome), to come a cropper after the long trip to Yugoslavia from Atlanta. That report we got last Labor Day while looking for a model in a Pennsylvania corn field. Met a chap in the corn who said he had been in Yugoslavia! This is known as MAN at Work's patented system for contest reporting.

* * *

Second wind department: Those Mystic Knights of the Sea, otherwise known as the Screamin' Demons of Long Island, will run on September 25, Bayville, N. Y., the Second Annual Long Island Sound Championships. No entry fee but be prepared to hire a row boat and, if you require more than two life preservers, additional ones cost 50¢ each. It is suggested that you don't put boosters in your pocket. This one baffles description. (Judges get far off shore and fish; we know, for we watched them through glasses.) For details, contact Don McGovern, 81-53 242nd St., Bellerose Manor, N. Y. . . . Fly, fly, fly; win a trip around the world, said the literature from the Jim Walker Model Airplane Meet. That's the Northwest Championships which will have been held by the time this hits the stands. Ninety-nine trophies, too. Fireworks, a rodeo, and Mom and Pop Robbers with the WAM stunt judges (toughest in the West!). Jim's idea, 'twas explained to us, is that a guy can fly his event any time he wants to: giant searchlights will take care of the night flying. Oh, if this one had only been closer! . . . Then there's Jim McGuire, president of the Montana Pilots' Ass'n., who invites us every year to a fly-in fish fry but, shucks, that's too fur, friend! Hot cakes, honey syrup, fried trout, coffee and orange juice. We'll have to get by on glow fuel fumes.

* * *

Capricious breezes and a warm, sunny day were conducive to the First Monogram Midget All-Plastic Race Car classic (what is this, Indianapolis?) as 38 competitors, all Monogram employers, vied for honors. Decked out in the owners' colors, the drivers were a sight to behold. Was rumored that all entries—the cars, that is, not the drivers—were put together with Mono Glue and Mono Dope . . . California Model Airplane Championships, May 29 and 30, Santa Ana (1952 Nats entries will remember the air ship dock), pulled 400 contestants and 25,000 spectators. No room for results but noted that Joe White was Grand Sweepstakes Champion and Bill White, Senior Class Champion. Boy, this really runs in the family. At the Philly Nats, last year, the biggest mix-up of all time took place when the National Championship was given to the wrong brother. Winning these things is such a habit that even they didn't know the difference. By golly, was it Joe or Bill that won? Six records fell at this swell meet, thanks to the Exchange Club of Inglewood and our good friend, the Navy.

Wanta buy a Zeek? Ray's Manufacturing Co., Box 4367, Tucson, Ariz., has the Half-A at $2.50 and the AB at $4.95 . . . Scale plan fans try L. Breault, 180 Stephenson's Rd., S., Oshawa, Ontario, Canada . . . To the frequent questions about fuses for free flight dethermalizers, have been giving out tattered tips

(Continued on page 47)

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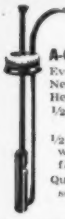

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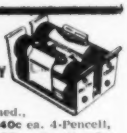

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FLASH NEWS

Leading the parade of novel aircraft this month is the Douglas Skyhawk, tiny delta to tote the A-bomb from Navy carriers.

by ROBERT McLARREN

Douglas XA4D-1 *Skyhawk* is the first tangible revolution in aircraft design produced by the atomic bomb. Assuredly many, many other aircraft can carry the A-bomb, but without exception all of these are designed to conventional specifications. The tiny, delta-wing A4D has but one mission: to streak into its target, drop its A-bomb and streak home.

Despite its trim lines, the A4D is not a super-fast fighter as is its F4D *Skyray* cousin (now supersonic with its new P&W J57 installed) but is, instead, designed for range. Powered by a Wright J65-W-2 turbojet of 7,220 lb. thrust, it has only half the power of the F4D but well over twice the range. The Heinemann Hot Rod, nicknamed after Ed Heinemann, its designer at Douglas El Segundo Division, weighs only about six tons, has a 27-ft. span, is 35 ft. long and was designed with one objective: to eliminate every ounce of excess weight and complexity.

For the first time in modern airline history, a U.S. domestic carrier has ordered a foreign transport. Capital Airlines will begin service next April with the British Vickers *Viscount* turboprop-powered transport to mark the entry of the gas turbine into U.S. airline service. Capital has ordered three *Viscounts* and signed an option for 37 more in the future. Capital President J. H. Carmichael says he has every intention of exercising the option and replacing his entire fleet with the British aircraft.

Capital is buying the *Viscount* for purely economic, hard-headed reasons—not for its glamour value. The four-engined airliner is powered by Rolls-Royce *Dart* turboprop engines of about 1,500 hp each plus around 400 lb. of static thrust, or roughly 2,000 hp each. With either 48 passengers in first class service, or 56 in tourist service, the Capital *Viscount* will cruise at about 335 mph, affording substantial schedule time reductions on the airline's eastern routes. In addition to this performance increase over Capital's *Constellations* and Douglas DC-4's (whose round windows are disguised by square paint jobs), the new turboprop plane can operate at a "break even" load factor of only 50.6 per cent. Meanwhile, Convair's Model 340 *Liner*, which lost out in final competition for the Capital order, is being readied in a turboprop version (two Allison T56 units of 3,750 hp each) for this new revolution in U. S. airline power.

Surplus military aircraft may again be passing into the hands of private owners, just as tens of thousands of them did immediately after V-J Day. The Air Force has launched Operation Spring Clean, which is designed to clean out excess aircraft. First offering is a group of 120 Fairchild C-82 *Packet* transports, which may find a ready market as freight carriers. Soon to be offered may be C-54's (Douglas DC-4 transports), North American B-25 *Mitchell* bombers and additional Douglas B-26 *Invader* bombers, many of which are already seeing service as fast civil executive transports.

The long-debated Convair XB-58 *Hustler* supersonic bomber project has now been given the official green light by the Air Force with an initial outlay of $99-million for "pre-production" work. This work includes the tooling of the Convair Fort Worth, Tex., plant for production of the giant, delta-wing, four-jet bomber. Although final decision has not yet been made, latest plans are to power the fast bomber with the General Electric J79 turbojet engine of about 15,000 lb. static thrust. The engines will be mounted in four pods extended downward and forward from the delta wing. The Air Force has no estimate as to the eventual cost of the program but plans to pour about $100-million a year into the project with first flight planned for 1957. The *Hustler* is the first of the "weapons system concept" procurement method in which a single prime contractor (Convair) is given sole responsibility for everything in the airplane.

Bell Aircraft is now pressing forward with the most radical new development in helicopter history: a flying wing machine. The new design consists of a flying wing with the passengers sitting in the wing leading edge behind windows providing utterly unlimited view forward. An engine and rotor are mounted in each wing tip. Flight crew sits in a central pod in the wing leading edge. Fully retractable landing gear and enclosed power plant are features. The new design is being projected solely for civil airline use.

The question by a few pessimists of whether the radical new Vertical Take-Off (VTO) aircraft would really fly has been answered with the recent demonstration of the Convair XFY-1 in vertical flight near San Francisco. The strange craft was placed inside the cavernous Navy dirigible hangar at Moffett Field, Calif., and a system of ropes attached to prevent accidents. With Convair test pilot J. F. "Skeets" Coleman at the controls, the XFY-1 rose vertically under its own power to a height of 60 ft. and returned gently to its resting place without incident. Since the first 60 ft. is the most critical stage of VTO operation, Coleman is now enthusiastic about future untethered flights which will permit him to take the XFY-1 to 10,000 ft. and test its level flight speed and handling characteristics.

Meanwhile, Lockheed test pilot Herman "Fish" Salmon continues test work on the XFV-1, which is being flown as a conventional aircraft with a jury landing gear in place. Salmon has been testing vertical handling characteristics of the strange machine at 10,000 ft., but will shortly attempt his first vertical take-off from the ground. Meanwhile, Navy says it has no present plans for production of either aircraft and describes

(*Continued on page* 46)

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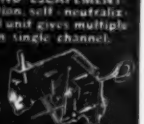

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them as purely development projects at this time.

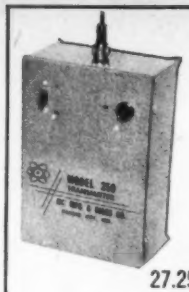
Sikorsky has introduced another new helicopter and this time the experts will have a difficult time keeping the various models straight. The new Model S-58 is known by the Navy as the XHSS-1 and by the Army as the XH-34. More confusing is the fact that the new model is a cross between the more familiar S-55 (HRS, H-19) and the big S-56 (HR2S). The new S-58 is clearly the S-56 fuselage with upswept tail rotor fin but the nose engine installation of the S-55. Especially designed for anti-submarine search duties, the new S-58 is in quantity production on a Navy order for 100 machines. Despite its ASW duties, the S-58 is a very fast machine with a top speed of more than 150 mph. It is powered by a Wright R-1820 *Cyclone* engine of 1,425 hp and can carry two tons of cargo or 12 fully-equipped troops.

You think blimps are a thing of the past? Not so, for the Navy is still pressing their development in their new anti-submarine warfare role. Goodyear has settled down to a monopoly in the field and is in steady production on continuing models for the Navy. Performance continues to increase and the new ZPG-2 recently remained aloft for more than a week, returning to earth with a new record of 200 hr. 12 min. endurance without refueling. This is a measure of the blimp's "station keeping" ability for hovering over suspected areas while its detection equipment is suspended in the water. Certainly no airplane or helicopter could remain on patrol for a week and this explains the Navy's insistent development of the blimp.

An indication of things to come is seen in the fact that the Glenn L. Martin Co. is shipping its production B-61 *Matador* missiles in seven containers to field installations, where it is assembled for use. This points up a practical advantage of the missile: ease of transportation. On second thought, however, it would hardly be practical to "fly away" missiles from the Martin plant, as are its airplanes. The first public firing of a *Matador* missile gave an earth-shaking view of future warfare recently at Patrick Air Force Base, Fla. The Allison J33 turbojet engine of the missile is run up to full throttle and the big Aerojet booster rocket is fired. The missile is airborne within its own length and sprints out of sight in a few seconds. It has a speed of better than 600 mph and a range of more than 500 miles. It is already in service in Germany with a second group scheduled to move to Germany this fall.

Activity on the flying boat front is increasing steadily, rather than dying, as its opponents have long believed. Convair now has installed two Westinghouse J46 turbojet engines in the XF2Y-1 *Sea Dart*, hydro-ski flying boat. Originally designed for the J46's, the F2Y was flown initially with two Westinghouse J34 turbojets because of J46 production delays. The new engines place the delta-wing F2Y in the transonic category. Convair has also redesigned its big R3Y model with "LST" bow doors. The bow *Tradewind* flying boat into the new R3Y-2 doors open up and a hydraulic ramp extends out into position for driving heavy vehicles directly ashore. Meanwhile, Martin continues work on its XP6M-1 *Seamaster* flying boat powered by four turbojet engines and featuring swept wing and high length-beam ratio hull. It will be ready next year and Martin sees commercial possibilities in the design on overseas airline routes.

The ramjet engine, long a laboratory curiosity, is coming into its long-expected prominence in the guided missile field, although applications are still highly classified. The Boeing XF-99 *Bomarc* pilotless interceptor is powered by two Marquardt ramjet engines giving it a high supersonic speed. North American's new *Navajo* long-range missile



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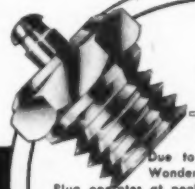

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is powered by a Wright ramjet engine featuring a turbine-driven accessory drive. Technically-minded readers may see in this turbine-equipped ramjet strong overtones of a turbojet engine but no compressor is used, the turbine being driven by the flow through the ramjet to drive the fuel pumps, generator and other equipment.

Air Force has activated its first Early Warning and Control Division, a top-secret operation. The Air Division will be made up of two wings of Lockheed RC-121C early warning radar picket planes. Each squadron will have eight aircraft, or a total of 48 planes in the Division. The new unit will maintain constant high-altitude, long-range patrol across the Northern Hemisphere with its giant radar equipment scanning the skies for hostile aircraft. To date, Lockheed has delivered 10 aircraft to the Air Force and an equal number to the Navy as WV-2's.

Strategic Air Command's Gen. Curtis E. LeMay reveals the complete integration of aerial refueling into standard operating procedures. "Last year," he says, "our planes made just under 16,000 hook-ups with tanker aircraft at predetermined rendezvous points, transferring 11,000,000 gallons of fuel. This averages out to a refueling operation each 15 minutes every day of the year." This is unspoken tribute to Boeing's KC-97 tankers but the Air Research and Development Command is already sounding out manufacturers for proposals for a jet refueling aircraft to handle the big Boeing B-52 *Stratofortress,* now in production, and the Convair B-58 *Hustler,* scheduled for production. Well in the lead is the same Boeing Airplane Co. with its new 707 *Jet Stratotanker.* However, ARDC is consulting with Douglas, Lockheed, Convair and Martin on the subject.

The U. S. Air Force now has its first all-jet Air Force in service: the Second Air Force of the Strategic Air Command. The Second is now fully equipped with Boeing B-47 *Stratojet* medium bombers, Convair B-36 (four General Electric J47 jets plus six P&W piston engines) and Republic F-84 *Thunderjet* fighters. Thus, just ten years after first flight of the first U: S. combat jet aircraft (Lockheed F-80 *Shooting Star*), a complete Air Force is now all-jet equipped.

Next new aircraft to hit the news pages will be Lockheed's sleek little XF-104 lightweight fighter and Northrop's giant, ominous guided missile, the XB-62 *Snark.* The F-104 is a straight-wing fighter powered by the conservative Wright J65 turbojet engine of 7,220 lb. thrust. It has been flown extensively at Edwards Air Force Base, Calif., but has not yet been ordered into production. Northrop's giant *Snark* is already in quantity production and is a swept-wing pilotless bomber for long-range surface-to-surface missions.

END

MAN AT WORK

(*Continued from page* 43)

on butcher's cord, venetian blind string, saltpeter and dry ice, the latter the only fuse in the world to break a modeler's foot (ask Joe Bilgri), but International Hobbies, Albuquerque, N. M., now has a unique fuse material (2¢ the foot at the dealer's). "We have always objected to fuse obtained by running a fireproof cord through a dynamite dip," says Walter Hanson. "In the belief that the secret of a slow burning (2 min./in.) foolproof fuse lay in the combination of material, weave and cross-section, we set to work. This tubular fuse is the result." It weighs .031 oz./ft., so that enough for six minutes of flight weighs .008 oz. "All ships used in tests are still with us," Hanson testified. Science, it's wonderful. There's nothing more aggravating than to have a fuse go out in the air.

END

LARGE SIZE PLANS

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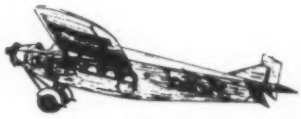

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Drawn by MODEL AIRPLANE NEWS' William Wylam. These drawings consist of four ¼ inch to the foot plans—double the size of the Ford drawings in the May and June issues. Two plates show side view and cabin details, two more the dimensional layout and front view details. Complete set $1, postpaid.

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DEPT. 27—KENOSHA, WISCONSIN

What's New in Speed?

(*Continued from page* 16)

The pan's exterior surface may be finished as follows: 1st—Use a body or vixon file to remove the sand casting look. Next—use a single cut mill file to remove all large scratches. Next—sand the pan with heavy grade emery cloth in an opposite direction to which you were filing. Make the final sanding with 200 grade wet or dry sandpaper. If a buffing wheel is available, the pan may be polished to a very high luster using regular automobile compound as an abrasive. The elevator may be mounted to the pan by 4-40 machine bolts.

The elevator can be made of either of two types of materials. An aluminum elevator is very durable; however, the problem of good hinges arises. You may use small cabiner hinges riveted to give very free movement; however, they give a fairly rough appearance on one side. Another method is to use small wrapping wire laced through a hole on the flipper and elevator and then solder the wire. One heavy piece of soft wire may also be used, but both of these hinges seem to get loose after a few flights and may cause control problems. The wooden elevator (usually plywood) is still this author's favorite, as the hinge problem does not arise so readily. Any number of different types of hinges may be used; however, the most free type of hinge is the old standby "S" type. This is a simple lapping of alternate strips of linen tape between elevator and flipper. The sewed type hinge, which has two pieces of this tape sewed together and uses the seam as the hinge, is very strong, but tends to be a little stiff on controls.

There have been several theories on elevators; some people like large, some small, elevators. An elevator of approximately 33% of the wing area is about the smallest practical size, with 50% of the wing area reaching the maximum. An airplane tends to be more stable with a larger amount of elevator area. It is optional whether a person wants the inside, outside, of both parts of the flipper movable. One thing for sure, you do want enough flipper available to control the airplane *at all speeds*.

The wing is likewise built of any of several types of material, the most prominent being the hardwood. The hardwood type construction enables a modeler to carve the exact airfoil sections that he desires. This type of wing does have two drawbacks as it must be painted with some type of fuel proof paint, and the control lines must be buried in the wing. The easiest way to insure good controls is to place a small piece of tubing, that will allow the lead-outs free movement, in the wing, and cover over the groove with a strip of balsa.

The metal wing is very nice for the more experienced builder as it provides a very durable portion of the airplane. In making the metal wing, the main thing to watch with care is the warping of the trailing edge when rivets are being applied. Usually the trailing edges of the wings are clamped together and the holes for the rivets are drilled and then riveted while the trailing edges are still clamped together. It is hard to get the exact airfoil desired; however, if the internal trailing edges are beveled at a slight angle, it will help eliminate "squeezed out" type airfoil that normally results in metal wings. The metal wings also cause some problems when mounting them as only a spar may be used for support. In the case of a midwing type airplane, the mounting problem is somewhat eliminated as the wing spar may be bolted directly to the pan after the bottom half of the airfoil section has been filed on the pan. This will give a zero incidence on your wing. The high wing presents a greater difficulty as the root rib section of the wing must be carved to fit the contour of the fuselage.

The upper half of the airplane is normally made of hardwood or a hardwood and balsa combination (Quick .60, April, 1954, MAN). This is a near necessity on high wing type airplanes; however, balsa may be used on midwing airplanes because the top half is used only to streamline the airplane and no strength is necessary. The standard procedure for making top halves is to outline the pan on a piece of wood of the desired thickness and carve just a little oversize. A hole is then cut for the engine and the top is fitted to the pan; then the sides are cut to shape.

One of the most important parts of a speed ship from the standpoint of safety is controls. They should be free of any binding at all times and the control mechanism should be anchored solidly to the wing. The wing in turn should be mounted in some manner where it is attached to the tie-downs. The tie-downs also are very important as a safety factor and should be well designed to take the strain of holding the ship together. The most practical tie-down is the one called the wing tie-down which has two bolts running through the wing and mounting in the pan. They may be screwed into brackets that are bolted to the inside of the pan or use a pan that has the tie-down facilities cast into the pan. The latter is the better method. The rear tie-down is a bolt that runs through the top half and is screwed into a tapped hole in the bottom.

Many fellows desire to cut away on the outside of the engine fins in order to facilitate ease of cowling the engine. You may

ENGINE	PROP	STOCK FUEL	STANDARD BLENDS	GLOW PLUGS	WEIGHT OF SHIPS	FUEL REQ. PER FLITE	SIZE OF BLADDER
THERMAL HOPPER	4 X 6 4 1/2 X 5	THIMBLE-DROME RACING	30% NITRO 20 % CASTOR OIL 50 % ALCOHOL	THIMBLEDROME RACING PLUG	2 TO 5 OZS.	10-12 C.C.	1 1/2" L
MC COY 19	6 X 9	SUPERSONIC 1000 THIS IS IT	35 % NITRO 30 % CASTOR OIL 10 % OIL OF MIRBANE 25 % ALCOHOL	MC COY HOTPOINT O & R RACING	10 TO 15 OZS.	22-25 C.C.	2 1/4" L
TORPEDO 19	6 X 10	SUPERSONIC 1000 STARDUST H	50 % NITRO 25 % CASTOR OIL 25 % ALCOHOL	CHAMPION VG-2 O & R RACING			
FOX 19	6 X 10 1/2 6 1/2 X 10	THIS IS IT	50 % NITRO 25-30% CASTOR OIL 20-25% ALCOHOL	O & R RACING MCCOY HOTPOINT O.K. LONG			
MC COY 29	7 X 10	O & R NO. 4 THIS IS IT	35 % NITRO 30 % CASTOR OIL 10 % OIL OF MIRBANE 25 % ALCOHOL	MC COY HOTPOINT CHAMPION VG-2	14 TO 20 OZS.	30 C.C.	2 1/2" L
DOOLING 29	7 X 9	THIS IS IT	40 % NITRO 25 % CASTOR OIL 35 % ALCOHOL	O & R RACING MC COY HOTPOINT O.K. LONG		35 C.C.	
MC COY 60	9 X 12	O & R NO. 4 THIS IS IT STARDUST H	30-40 % NITRO 25-30 % CASTOR OIL 20-35 % ALCOHOL 10 % OIL OF MIRBANE	O.K. LONG CHAMPION VG-2	25 TO 32 OZS.	50 C.C.	3"
DOOLING 61	8 X 11 9 X 11	THIS IS IT (WITH ADDED NITRO)	50 % NITRO 25 % CASTOR OIL 10 % OIL OF MIRBANE 15 % ALCOHOL	O & R RACING MC COY HOTPOINT		60 C.C.	

These listings are intended only to convey how speed fliers seek out combinations of fuels, etc., best suited for local conditions. In other sections, other combinations may be favored. Therefore, this typical listing does not constitute an endorsement of any particular commercial brands.

either turn the fins down in a metal lathe to reduce the total diameter, or file the fins flat on each side to reduce the cross section. The exhaust is cut off to a point where it is no wider than the fins.

The cowling is probably the most varied portion of the speed ship. All types of cowling have been used and several types of material have been used to make them. Probably the two most popular cowl designs are the helmet type pressure cowl, as used by Harold deBolt, and the Hell Razor cowl, which is used by George Fong. The pressure cowl may be made of balsa, hardwood, or a combination of balsa and plywood. This author prefers to use balsa inserts to form the channels for the air to flow through, then to glue a hardwood top over the inserts and finally to wrap the outside of the cowl with 1/32 inch plywood. This is not the easiest cowl to build, but it is very strong and will take a beating. A quick method to build a cowl is to drill a hole in a balsa block that is large enough to fit the length, width, height of the cowl. Make the hole fit very closely around the cylinder of the engine. Next, shape the outside as desired. The air ducts are then cut in the block and the top is glued on. The most practical type cowl to use on a front rotary type engine is an all hardwood cowl made in a similar manner; however, it is best to cut the shapes of both sides of the cowl on a band saw. This hardwood cowl adds considerable strength to the nose which has been weakened by the cut-out for the needle valve. It is always advisable to use hardwood on the top of any cowl.

There are two general design classifications in speed—the midwing and the shoulder or high wing. The flying characteristics of the two types differ greatly. The average high wing ship tends to fly in a bank with the degree of the bank depending on the height of the wing off the center line and the weight of the bottom half. This type of ship, in general, will not fly in the groove as well as the mid-wing design but lands a little slower.

The mid-wing ships do not tend to glide as well with a given wing area and weight, because the higher center of weight with reference to wing location, but do have the advantage of interchanging wing spars in case of crack-ups.

Just as the trend in design was away from rudders on speed ships a few years ago, the pendulum is once again swinging toward this feature. Many of the boys are using 2 or 3 degrees inset on the rudders to reduce line tension. This author has experimented with lifting air foil rudders that accomplish basically the same purpose and theoretically have less drag.

The most popular type dollies now in use are the wing lock-on type (as illustrated) and the trigger type dolly similar to the one used by Herbert L. Davis. These dollies insure that the airplane has flying speed enough to lift an object heavier than the ship itself before it leaves the ground. Care should be taken in tracking the dolly before each flight. On concrete or hard top surfaces, the dolly should roll straight ahead and the two front wheels should be wrapped with scotch tape to keep these wheels from having any traction. On dirt, such as a baseball diamond, the dolly should track in in the same manner; however, no cellophane tape is necessary. On grass, the dolly should track in in a smooth arc to the outside of the circle in order to insure line tension at all times. Once again no tape is necessary. It has been found that a wide wheel such as a Trexler Air Wheel is very good on grass as it tends to roll over the grass rather than through it. The dolly should be built with the front wheels almost as wide as the wing span of

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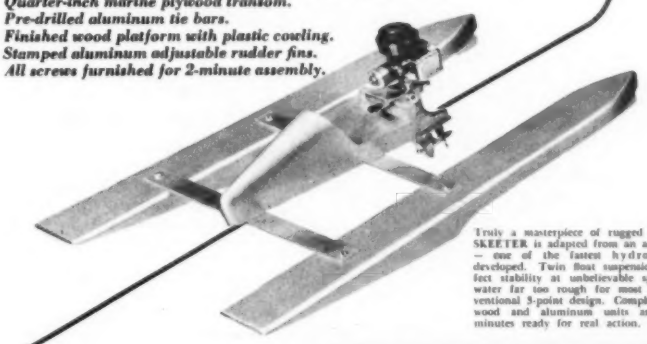

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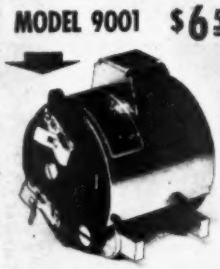

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the airplane and extending about two inches in front of the prop. The tail wheel should extend an inch or two beyond the tail of the airplane. When the airplane rests in the dolly, it should have a slight positive angle of attack. This shortens the take-off run considerably and lessens the speed necessary to get the airplane into the air.

The pen bladder tank in speed is similar to the all equalizing thermal factor in free flight. Much has been said about tanks, but Chuck Schuette's gift of the balloon tank to the model world in 1950 has done more to let the average modeler compete with the big boys than any other one thing. Very little practice is necessary for Joe Modeler to get used to setting his engine with this constant pressure tank. It should be pointed out here that you don't have to have a mechanical starter to start engines with this tank setup; however, it is very desirable. A little prime in the exhaust and the needle valve opened about 1/4 turn, a McCoy .60 or Dooling .29 can be started with very little trouble . . . just be quick on the needle valve!

In making the pen bladder tank, care should be taken to make sure that the fuel is flowing freely out of the tank. A practice squirt of fuel should go well over two feet. This sounds like a simple thing, but too many times, fellows who do not test their tanks for pressure, have had bad runs only to find out that they have bound the tanks too tight and the fuel was running out under very low pressure or that the tank was old and weak. Brass tubing placed in the fuel line is a good remedy for this trouble. Here, it should be pointed out that black neoprene, as distributed by Kap-Pak and Perfect Parts should be used at all times. One piece can be used many times, but care should be taken to ensure that the end does not fit the jet too loosely. Vibration can shake it loose during flight. (*To be continued*)

Notes on RC Installations

(*Continued from page* 22)

this installation whenever possible.

Battery Location: Much depends on whether you favor the use of battery boxes or battery packs. Most prevalent location for battery boxes is on the underside of a plywood floor, accessible by means of a quickly removable hatch on the bottom of the fuselage. Very few planes lend themselves to battery installation in the cabin itself, largely because of the center of gravity problem. RC ships tend to be tail heavy.

Where battery in-the-cabin deals work out, a tall, shallow compartment between the front cabin bulkhead and the receiver is practical; this virtually dictates a battery pack arrangement unless some tricky slide is resorted to.

Another easy and practical choice is to make the top of the nose removable, so that either battery boxes or packs may be inserted. It is essential that the structure be strengthened to transfer the forward load of heavy batteries to the frame in such manner that failure doesn't result. For example, a battery pack may be placed snugly against a thick balsa or plywood bulkhead (grain in an appropriate direction if balsa) so that momentum is not picked up through movement. This key former should be anchored on the butt or shoulder ends of side ply or blocks, be cross braced if necessary, and possibly rest against the rear ends of the motor bearers. If battery packs are used, make up replacement sets. Lead the wires as a cable into a plug for quick insertion.

Escapements: Though some builders prefer to place the escapement in the rear of the plane for convenience, the trend is to cabin-mounted escapements. Here, the escapement is mounted on the rear cabin bulkhead, accessible, yet clear of the receiver. Mechanical action for moving the rudder or elevators is provided by a torque rod (or push rod) with a yoke at either end, if required. The rod may be a square piece of balsa with the music wire yoke or pin, thread bound, and cemented in place, or it may be lengths of brass tubing with the yoke or pin inserted and soldered. The escapement should be braced against breaking free in a forward direction, and it is desirable that it be mounted on a plywood slide that allows the escapement to be removed from the plane for inspection and adjustment.

Push rods and bellcranks work well on most planes but require care in design and installation when the plane is large, fast moving or heavy. Elevators in particular are a problem, because their weight and aerodynamic load may be large. Static counterbalancing is necessary in many cases and aerodynamic balancing may have to be resorted to. In nose-down positions, the weight of the rod, etc., is on the escapement, compromising its operation. Servos can be arranged like escapements but fortunately have greater force for moving surfaces. Use fairleads with pushrods, exactly like U-Control.

Wiring: Wiring should be neat and as short as possible. Wires may be led along the floor, or sides, and held down by U-shaped pins and cement. When possible, use the wires as one neat cable. As a rule, it is possible to bring battery wires to a socket, inserted in ply or balsa, soundly attached to the floor, side or bulkhead, and then to arrange the receiver wires as another cable to plug into the socket. Pots, jacks and switches should be conveniently mounted, usually on the left side of the plane where they can be reached quickly by the fellow doing the launching, and by you during a field check. Thin, ply reinforcement to the side sheeting is recommended.

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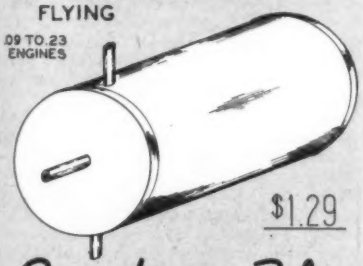

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So many receiver installation arrangements are possible, and so many variations in details exist, that it would be impractical to burden the newcomer to RC with such a strenuous indoctrination. This copy is intended merely to help the tyro get his feet on the ground. Since a picture is worth a thousand words, representative examples of good installations have been sifted out and shown in detail. END

Engine Review

(*Continued from page* 32)

way in which they steadily improved over the first eight to ten hours' running is especially interesting. Although the instruction sheet stresses the importance of a gentle break-in of at least 45 minutes, we found no tendency to seize during or after that period. However, our engines noticeably improved after about two hours and would hold maximum revs for several minutes, whereas initially the power would fall off as maximum temperature was reached. After about eight hours, installed in European Class A Team Racers, turning 7 x 6 Power Props cut down to 6 in., both engines stay right on the peak through the entire tank, and hit almost identical speeds at around 85 mph.

A point worth noting, incidentally, if you have occasion to strip a .15, is to take great care when reinserting the cylinder into the crankcase. With such a large bypass passage and thin cylinder walls, it is very easy to jam and distort the cylinder by forcing it in out of true with the crankcase bore. Another point which may be of interest is a correction to the original report which stated that an aluminum drop-forged conrod is fitted. Actually this is true for all the Torpedos except the .15 which has a pressure die cast aluminum rod, although for a casting it looks like an awfully good forging. END

Zippy

(*Continued from page 20*)

the rubber motor. The propeller thrust bearing may be purchased or made from a metal strip with the hole drilled out or punched out with a phonograph needle.

Cement the wing struts to the wing and the rudder, stabilizer and landing gear struts to the motor stick. This will require patience especially if the cement is slow setting. Finally cement the wing with its struts to the motor stick as shown in the pictures. Slip on the plastic propeller and rubber motor.

Wind the propeller clockwise until a row of knots appears and gently release the model in a forward motion. The model should fly fast and up in a circle. You are now on your own and you will learn quite a few things from this little model. If the model has a tendency to dive, the wing must be moved forward a bit. Should the model oscillate up and down, wing should be moved back.

The model can be flown outdoors in a calm and you can use a small hand drill to get more turns in the rubber. Rubber models are usually wound with a drill that has a hook on the end of it to catch the rubber. Stretch the rubber about three times its length. The drill is turned and slowly brought to the model as the rubber tightens as it is twisted.

LIST OF MATERIALS

Wing stabilizer and rudder: two 1/16 x 1/16 x 36 balsa; motor stick: one 3/32 x 3/16 x 11 balsa; struts for wing and landing gear: one 1/16 x 3/16 x 12; one plastic 5-in. Kaysun propeller (rubber model type); wheels, cardboard or 1/16 x 1 x 2 balsa; one one small size thrust bearing; 1/8 or 3/32 flat rubber, 14 in. long; one sheet tissue paper; cement; small paper clips or straight pins for wire fittings.

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Higgins Cabin Cruiser

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control. With the E.D. rudder servo unit you can go from half-left to half-right and back to half-left again without requiring to pass through full left or right. Besides this, the rudder can be moved to any position that the operator desires and not only to a few restricted positions. Another advantage is the positive action regardless of the speed of the boat. Many model RC boats have trouble with control because the escapement sometimes cannot overcome the force of the water on the rudder on high speed craft.

Construction begins with the 1/4 in. sheet hard balsa keel; cement pieces K-1, K-2 and K-3 together firmly. Cut all bulkheads from A to J. Notice that some of these are plywood. These items are cut in one piece for strength. The direction of grain should be followed. The bulkheads or frames are cemented to the keel. Cut the chine from hard sheet balsa, pieces C-1, C-2, C-3 and carefully cement these into the notches in the frames and to each other. The hard sheet balsa deck forms, pieces D-1, D-2, D-3, D-4 should now be cut to shape and cemented into the frame notches. Recement all joints.

Mahogany veneer is available at many model shops and lumber yards that specialize in hardwoods. Select a veneer that is about 1/20 in. thick. Those builders who hesitate using any other wood but balsa can cover their model with 1/8 in. sheet balsa. This is not recommended. A trial fitting is in order before any veneer is cemented in place. Sandpaper the entire framework with a block in order to be sure that the chine, keel and deck forms are flush with the frames. Hold the veneer against the hull side and, with a sharp dark pencil, trace the outline of the area to be covered onto the veneer. It is important to cover each area in one entire piece to avoid seams which would invite leaks. When the veneer is cut to shape it can be cemented to the framework. Apply a slow drying cement to every frame as well as to the chine, deck form and forward portion of the keel. Hold the veneer covering in place with straight pins. When this is dry apply a coat of cement to every joint from the hull interior. Repeat this covering procedure for the other side and the two bottom halves. Be sure to use plenty of cement during these operations.

Cut the sheet balsa transom to shape and cement in place. Shape the hardwood rudder tiller housing and carefully drill a 1/8 in. dia. hole in it to receive a brass tube sleeve. This sleeve is slid into the hardwood housing and should be a rather tight fit. Cement this firmly to the hull.

Install the engine mounts. Cut the plywood mount in one piece, and cement and screw it to the hardwood mount support. This support is made from ordinary 1/4 in. boxwood from an orange crate. The entire assembly should be very firmly cemented into the hull. Notice that the mount supports obtain much strength from bulkhead E and, therefore, should be well cemented to this strength member. Apply several coats of cement to the engine mount installation. The engine mount is designed for radial, bulkhead-mounted engines; however, beam-mounted powerplants can be installed through the use of metal triangle mounts similar to the K & B variety.

There are many propeller, propeller shaft and shaft housing or stern tube assemblies on the market today. The prototype model performed well using a drive assembly sold by the Allyson Company of Newton, Massachusetts. This consists of a 1-1/2 in. diameter three bladed cast propeller, a threaded propeller shaft and a shaft housing or stern tube that fits the shaft perfectly as well as a strut. This propeller can be filed down to a 1 in. or 1-1/4 in. diameter for .099 in. engines. Drill a hole through the keel to receive the stern tube and force this into the hole as the plans illustrate. Apply plenty of plastic wood around this tube in the boat interior in order to insure a firm installation.

The controlling equipment is now installed. (Procedure depends on equipment being used—Editor.) Screw the E.D. rudder servo to a sheet of 1/8 in. plywood and cement the plywood to the keel and bulkheads I and J. Bend the rudder tiller arm from 1/16 in. music wire. Note the long return bend that forms a slot for the servo rider. When this is bent, slip the wire through the tiller housing. Bend the lower portion of the tiller arm as the plans illustrate and solder well to a sheet copper or brass rudder.

All wiring is connected to the various components on the E.D. Aristrol receiver. The only wiring connections to be made are to the E.D. servo unit as shown on the diagram. Our boat was covered with 1/16 in. sheet balsa on the sides and bottom of the interior. This is optional but does improve the appearance and aids in keeping the hull interior clean. Regardless, it is necessary to construct a panel 1/16 in. sheet balsa for the potentiometer, switch, and meter test-socket mounting. Cover the boat interior now if desired.

The receiver is located in the bow compartment in removable fashion. The compartment is made of 1/8 in. sheet balsa and is lined with foam rubber. This should form a snug fit around the receiver, thereby causing the receiver to "float" in the rubber mounting. Do not install the receiver unit at this

(*Continued on page 54*)

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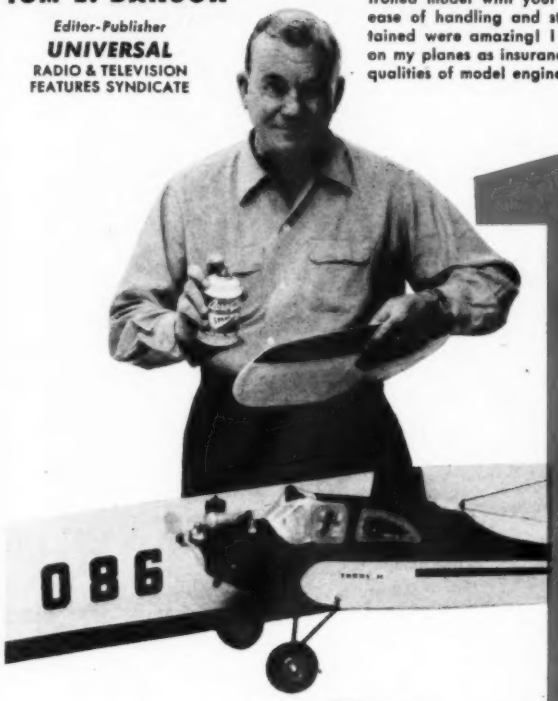

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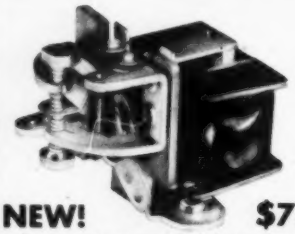

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time in order to prevent it from getting dusty from wood sandings, etc.

Construct the battery boxes. These are made from 1/8 in. hard sheet balsa. If desired, standard metal battery boxes can be used. Use the size batteries specified on the plans. Pencells will not last long enough to insure proper power output for any length of time.

Check the operation of your radio installation and then cut pieces D-7 to D-12 from medium sheet balsa and laminate as shown. Cement in place atop the hull. When dry, carefully trim to shape and sand smooth.

A brass or copper tube is used for the antenna sheath. This is soldered to the aerial wire and installed as shown. A music wire whip antenna is slid into this sheath. This should be 24 inches long. Solder a regular B-B pellet to the top as protection against injury to yourself or spectators.

Paint the hull interior several times. We used white dope. Sand well between coats and apply two coats of fuelproofer to the entire interior. Through necessity the fuel tank must be extra large. The tanks specified on the plans should prove adequate for average controlled cruises. Install the fuel tank at this time. Be sure to mount this firmly in order to dampen any vibration.

The best type of universal joint is the pin and slot type. It is not advisable to use rubber tubing or spring type universals on this craft. Solder the universal to the propeller shaft. This must be done very firmly. The other end of the universal is threaded and care should be taken to purchase a universal joint with threads that match the engine.

Install the powerplant onto the plywood mount now. It is impossible to operate without a flywheel. The size depends upon the size of the engine. The flywheel is very firmly attached to the engine and the universal joint to the crankshaft. On engines that have machine screws threaded into the crankshaft, to hold propellers or flywheels in place, it will be necessary to cut off the head of the screw to provide a threaded area for the universal joint.

The cabin, S-1, S-2 and S-3, is cut to shape from sheet balsa. It is advisable to cement the top and sides together and to the hull simultaneously in order to attain the correct slope to the side pieces before the cement dries. When this is firmly cemented, the windshield frames can be added. These can be made of dowel or balsa strips sanded round.

A slick, smooth finish is a virtual guarantee that the hull is waterproof and, in view of the fact that boat smash-ups are virtually non-existent, you will not see the results of hours of work destroyed before your eyes. We finished our model in standard model airplane procedure using standard model airplane materials. Fill any cracks or crevices with plastic balsa. Sand the completed hull thoroughly with 3/0 sandpaper before applying the sealer. Brush on, liberally, at least four coats of sanding sealer. Apply more if desired. Sand with 3/0 sandpaper after the first three coats and with 6/0 finishing (wet) paper after that. When the model surface is smooth the color can be applied. This craft can be painted to suit the builder's individual taste.

Brush three or four coats of white dope onto the hull sides and transom. Care need not be taken to keep the white color confined within its borders. It is advisable to add two more coats thinned about 15%. When this is dry the deck can be masked off from the hull side and transom. The deck is colored buff, and applied in the same manner as the white. Here again care need not be taken to avoid overlapping onto the areas to be colored blue. Apply masking tape to the white sides in order to separate the white from the green boot top. It is important that the edge of the tape be clean and fresh. Always press the edges of the tape firmly to the hull with the fingers to create a good seal so that no paint will seep under it. Apply green dope onto the boot top area. When dry, mask the green from the boat bottom and paint the bottom red. All that remains now is to color the cabin exterior medium blue and the face of the cabin step silver. Draw parallel horizontal lines on the silver cabin steps with India ink and draftsman's ruling pen. These simulate louvers on the full scale cabin cruiser.

Add the scale marine fittings such as lights, step plates, railing, flag staffs and flag staff supports. These are available at many model shops, in cast metal form. The railing can be made from music wire. Gold decals with black outline (for name) may be purchased at the local hardware store. With all miscellaneous detail in place the entire boat should receive two coats of clear fuelproofer. Do not sandpaper this fuelproofer application.

The Ripmax "beep box" continuously sends impulses to the E.D. receiver attempting to actuate left and right rudder. These impulses are so frequent that the result is a mere vibration of the rudder. When the red button is pressed on the "beep box" the rudder will cause a left turn and will stop moving when the button is released. Pressing the same button will cause the rudder to move farther to the left. However, by pushing the green button, the rudder will turn to the right regardless of its position. Control response is quick, flexible and inexhaustible.

Start the powerplant out of the water and place the boat in the water when the engine is operating at peak performance. The engine can be started by flipping the flywheel by hand or by using a strip of strong tape. Wrap the tape around the flywheel and pull the end firmly but smoothly. The unwinding of the tape will cause the engine to turn over and start. Be sure to have the rudder in neutral position when launching the model and never launch the craft without first testing the radio. Make sure you know how long your fuel supply will last so as to bring the craft close by for ease of retrieving when the fuel is depleted.

No. Req'd.	*Size*	*Material*	*Use*
4	1/20" x 4" x 36"	Mahogany veneer	Bottom and side hull covering
3	1/4" x 3" x 36"	Hard balsa	Keel, chine, deck form, deck, cabin sides
1	1/2" x 3" x 36"	Medium balsa	Transom, cabin top
1	1/8" x 3" x 36"	Hard balsa	Battery boxes, decking & bulkheads
1	.032" x 1-1/2" x 1-1/2"	Brass or copper	Rudder
1	.064" dia. x 10" lg.	Music wire	Rudder tiller arm
1	1/16" I.D. x 3" lg.	Brass or copper tube	Tiller arm sleeve
1	1/16" O.D. x 7" lg.	Brass or copper tube	Antenna sleeve
1	.032" dia. x 24" lg.	Music wire	Antenna
1	1/8" x 6" x 24"	Plywood	Bulkheads, engine mount
1	1/4" x 3" x 4"	Hardwood	Engine mount support

8 oz. sanding sealer, 4 oz. white dope, 2 oz. medium blue dope, 2 oz. buff dope, 2 oz. medium green dope, 4 oz. red dope, cement, flywheel, propeller, universal joint, propeller shaft, shaft housing, 1/0, 3/0 and 6/0 or 8/0 sandpaper.

NEW CALIFORNIAN FREE-FLIGHT...

Just in time for the Contest Season...

Berkeley's V.T.O. AMAZON "400"

Designed by: Stan Hill

"BUCCANEER"..."POWERHOUSE"..."HOGAN"... Berkeley has made these names a legend in the Contest Record Books!

Now we take pride in adding the **AMAZON "400"** to our line of contest craft. Thoroughly tested, contest proven, this unique aircraft is a refreshing departure from the pylon trend. Light, rugged and efficient, it is designed to exact every inch of altitude possible for its thermal soaring glide. "Amazon's" near vertical ascent acclaimed by British Contest Flyers as the "Fastest climbing aeroplane ever seen in competition!"

The kit is Pre-fabricated as only Berkeley knows how. Selected Balsa and Plywood, Die-Cut, Notched and Shaped Parts where applicable; Wheel, Hardware, Covering etc.; and above all Full Size thoroughly detailed and lettered Plans with construction sketches and various engine installations. Construction time is low, a point to consider in the pre-contest rush.

$4.95

Meets F.A.I. and A.M.A. Rules!

*Vertical Take-Off or Normal R.O.G. for .14 to .23 Engines—62" Wingspan

Vertical Take-Off

NEW! Chris-Craft 1" Scale OUTBOARDS...

"16' OUTBOARD CRUISER"

Formed Vinyl Hull and Foredeck

Formed, not molded, from sheet vinyl—the fuel proof, fire and shock-resistant wonder plastic.

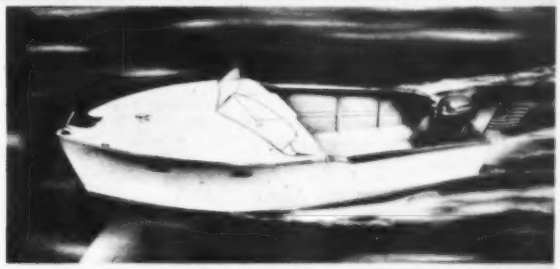
For "½A" & Electric Outboard Engines 16" Long

Featuring: **Formed Vinyl Hull and Foredeck**

(Manufactured under U.S. Patents No. RE 23,171 and 2,357,806)

- Full Size Plans, Instructions
- Special Plastic Cement
- Die-Cut Balsa Bulkheads
- Plywood Transom Insert
- Die-Cut Plastic Windshield
- Cast Deck Hardware

This is the model of Chris-Crafts Newest Kit Boat. It's a perfect design for Electric or Gas powered Outboard Motors. New light construction makes it a top performer with either type power. See it today!



Build it in a little over One Hour! **$3.95**

READY-TO-FLY

NEW! "SUPER YANK"

.035 to .049 Engines—27" Wingspan

READY TO FLY... **$1.95**

Nothing to Build!

Everything completely finished, colored. Even the engine mount is drilled for you.

Bolt in your engine, slip on the nacelle, wing and stab . . . Flip prop and fly it!

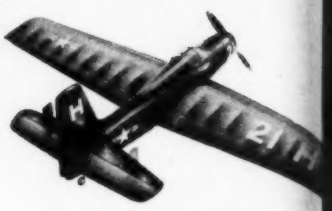
buy BERKELEY at your local dealer!

If no local dealer is convenient, mail-orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N.Y. Please include 25¢ postage & package.

Berkeley's NEW Controliner* FOR '54

- Deep Drawn Metal Cowl
- Complete Full Color Decal Insignia
- Complete Metal Hardware
- Formed Landing Gear
- Rubber Wheels
- Full Size Detailed Plans
- Completely Pre-Fabricated Wood Parts

$5.95



Bob Elliot's GRUMMAN "GUARDIAN"

For .19 to .36 Engines **53" Wingspan**

Here is the latest design from the board of Bob Elliot, 1953 National Stunt Champ. A truly beautiful model, it is very close to actual scale, but can do the full stunt pattern with ease. When it comes to appearance, it will win top points for the exacting builder.

This great new model makes an ideal Carrier event airplane, as it handles so easily! No trouble catching the arresting gear with this model.

SEMI-SCALE STUNT

For Stunt Events and Navy Carrier

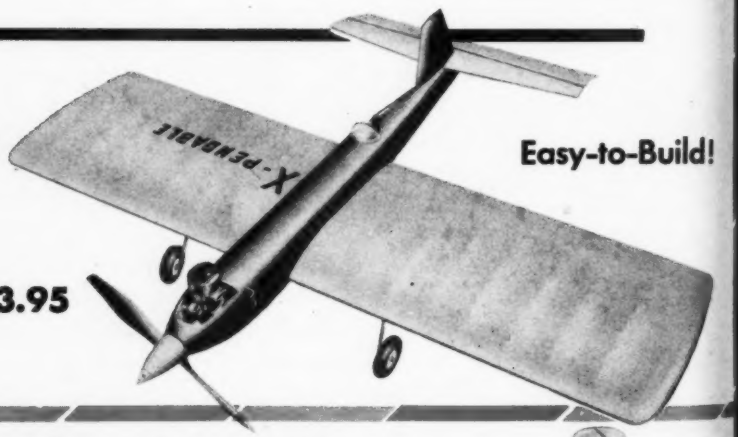
Newest in Combat Stunt —

ZILCH "X-PENDABLE"

For .19 to .35 Engines — 38" Wingspan

The Controline Combat Ship that outperforms them all. Designed and tested with typical Saftig precision. You can build it in the same time it takes to build a profile job, but you will have a lighter, stronger, and faster model!

Kit includes all Pre-fabricated Wood Parts; Complete Controline Hardware; Metal Landing Gear; Rubber Wheels; and FULL SIZED PLANS, detailed as only Berkeley details them.



Easy-to-Build!

$3.95

Beech Aircraft's T-34A "MENTOR" Controliner

For .14 to .29 Engines — 33" Wingspan 1" Scale

Beech Aircrafts T-34A Primary Trainer has been ordered into production for the USAF. Powered by a 225 hp. Continental, the two-place "Mentor" has a ceiling of 20,000 feet, speed of 180, and a range of 785 miles.

- Jim Walker U-Control
- Optional Autotrol Rudder
- Plywood Motor Mount
- Formed Tricycle Gear
- Authentic Full-Color Decals
- Rubber Wheels Hardware
- Embossed Celluloid Canopy
- Carved Nose Cowl Blocks
- Elevator and Rudder Hinges
- Die Cut Balsa and Plywood
- Full Size Detailed Plans
- Shaped Notched Wing Edges

Proportions of the T-34A are perfect for Controline flying. Easily assembled by the "Step-Keel" method, the fuselage is balsa planked. The wing is reinforced to absorb landing impact. Jim Walker "U-Control" is used together with the optional "Autotrol" Rudder system. Decals are complete and include even the smallest details.

$4.95

Flash! Mentor wins Navy Competition, to be Navy's Standard Primary Trainer.

buy **BERKELEY** at your local dealer!

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DESIGNED FOR STUNT

K&B
TORPEDO
.35
K&B TORPEDO .35 Designed expressly for super stunt flying. Precision engineered for maximum strength with minimum weight. The new .35 is rugged, dependable. It is K&B championship quality.
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K&B...PRODUCERS OF CHAMPION ENGINES

K&B TORPEDO .15

WORLD FF POWER CHAMPION

K&B TORPEDO .19

WORLD SPEED CHAMPION

NOW... Introduces a NEW CHALLENGER

We of K&B Manufacturing Company are proud of our world champion engines. As you know, our Torpedo .19 holds the Class "A" open speed record. Our Torpedo .15 holds both the individual and team power records. Now we introduce a new engine, the Torpedo .35 to challenge the stunt events. Our engineers have put their many years of engine "know-how" into the design of this great new engine. To meet the exacting demands of today's stunt fliers many advanced features have been incorporated into the .35. We are proud of it. We proudly invite you to test it.

SPECIFICATIONS

Bore .790 Stroke .720
Displacement .35 Weight 7½ oz.
Peak H.P. .60 at 14,000 RPM
Recommended prop 10" diameter 6" pitch
Price $14.95

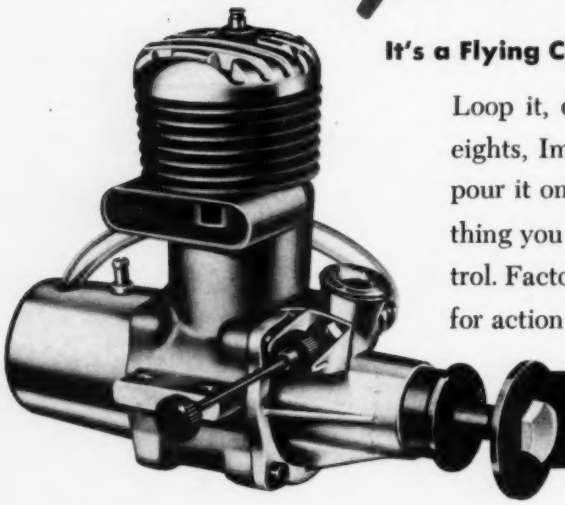
TORPEDO K&B ENGINES

K&B MANUFACTURING CO.

224 East Palmer St., Compton, California

Acrobat of the Air!

McCOY SuperStunt "19" SPORTSMAN



It's a Flying Circus... the Sport Engine that does Everything!

Loop it, dive it, steep climb it or power dive it... do figure eights, Immelmanns, snap rolls or fly inverted. In fact... just pour it on! The new McCoy *"19" Sportsman* will take everything you give it in stunt, free flight, team racing or radio control. Factory flight tests under contest conditions make it ready for action and assure you the best in flying.

Superior port timing means quicker starts, extra power.
Greater fuel suction makes intricate maneuvers easy.

A STUNTING MARVEL BECAUSE:

A two-ringed aluminum piston with hollow wrist pin and forged aluminum con rod make the *"19"* a balanced, smooth-running engine. The carefully micro-honed sleeve delivers higher compression and extra power in this longer-lasting, trouble-free performer.

With new front plate design and bronze bearing, plus non-critical needle valve... the *"19" Sportsman* proves a sensational aerialist.

ALL THIS EXTRA FLYING FUN AND STILL...

ONLY $9.95 Complete with fuel tank.

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Buy and Fly a Checkered Flag Line Engine

For top performance make sure you use McCoy *Glo Fuel.* Pts. 90c. ½ Pts. 50c.

Prop Suggestions

Stunt .....9"x4"
Free Flight...9"x3"
Radio Control 9"x3"
Team Racing..9"x5"

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